

Walk this Way: A Conditions and Needs Assessment of Davis Square

MAY 2023



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GRADUATE SCHOOL OF ARTS AND SCIENCES
Urban and Environmental
Policy and Planning

SASS

— Somerville Alliance for Safe Streets —

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A Conditions and Needs Assessment of Davis Square

May 2023

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Cover Photo: Sara Han

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[DavisNow.org](https://davisnow.org)



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Mayor *Katjana Ballantyne*

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Executive Summary



Davis Square is a vital hub of economic activity, recreation, and transit in Somerville. With high volumes of pedestrian, bicycle, and vehicular traffic, the square is a dynamic environment for people to navigate through. Much of the square's public space is dominated by car-centric infrastructure, which renders portions of the square inconvenient, unfriendly, or unsafe for pedestrians.

A local advocacy group, the Somerville Alliance for Safe Streets (SASS), is engaged in work to make Somerville's streets safer and ensure equitable access for all users. Our Field Project team partnered with SASS to examine questions of safety, accessibility, and pedestrianization in the context of Davis Square. This research seeks to assess the current needs and conditions of Davis Square's streetscape, with a focus on the experience and safety of pedestrians.

We also consider the potential impacts of pedestrianizing Elm Street through an assessment of pedestrianization efforts across the United States. With heavy amounts of vehicular though traffic, the square's public space primarily benefits drivers using the square as a route to another destination, rather than those that live, recreate, and do business in the Davis Square community. Pedestrianization presents an opportunity to reorient Davis as a place to be rather than a place to pass through. An emerging body of literature on pedestrianization lends insight to the components of successful schemes.

Following a review of plans and proposals concerning Davis Square, our team conducted fieldwork and public outreach to inform recommendations on improving accessibility, safety, and vitality of the square. Our research methods included conducting a literature review on existing pedestrianization schemes, running pass-through counts to gather quantitative data, analyzing spatial trends through GIS mapping, holding semi-structured interviews with stakeholders,

administering a public survey that received over 650 responses, and organizing four focus groups with community members. The response to our outreach efforts exceeded our expectations, showing the community's commitment to the betterment of Davis Square.

The following themes emerged throughout our research process:

- The majority of surveyed community members see pedestrian safety and accessibility in Davis Square as a priority.
- Elm Street and the square's central intersection are hot spots of congestion and vehicular incidents, with many community members considering these corridors as inconvenient and unsafe for pedestrians.
- While surveyed community members had divided opinions on closing Elm Street to cars, our literature review finds that pedestrianization can be beneficial if gradually implemented with good communication and community buy-in.

Based on the results of our research, we recommend the following:

- Increase pedestrian accessibility by maintaining and improving physical infrastructure in Davis Square.
- Foster safe and efficient traffic flow for pedestrians, cyclists, and motor vehicles through reprogramming traffic and crossing signals, increasing the number of loading spaces, and constructing bike lanes to bridge the gap in the Somerville Community Path.
- Develop and implement a pilot program for temporary weekend closures of Elm Street to motor vehicle traffic.

We hope the results of this project will help inform and shape plans for Davis Square moving forward. Human-scale developments and improvements that prioritize safety and accessibility can reclaim spaces currently unavailable to businesses, pedestrians, and cyclists. As such, our recommendations aim to create an environment that can be safely accessed by all users of the square.

Team Introductions



Clem Doucette is a first-year Master of Urban Planning student at Tufts University and a 2022 graduate of Vassar College, with a degree in Russian Studies and Geography. Clem is interested in stormwater management policy, land use and zoning law, and equitable transportation planning. Clem's favorite place in Davis Square is the Burren.



Sara Han is a first-year Master of Urban and Environmental Policy and Planning student at Tufts University. She graduated from the University of Florida in 2019, earning her BA in English and minor in Asian American Studies. Sara's interests include sustainable transportation, community economic development, and urban design. Sara's favorite spot in Davis Square is Buffalo Exchange.



Jacob Gerigk is a first-year MS student in the Urban and Environmental Planning Program at Tufts University. He graduated from the University of California, Los Angeles in 2020 with majors in Global Studies and Geography/Environmental Studies. Jacob's favorite Davis Square spot is Dragon Pizza.



Mikayla Perry is a first year Sustainability MS student at Tuft's University, with a focus on corporate sustainability. As a graduate of Salve Regina University in 2022, Mikayla majored in Environmental Studies with minors in Economics and Marketing. Mikayla's favorite Davis Square spot is Five Horses Tavern.



Phoebe Whitwell is a first year MA student in Urban and Environmental Planning and Policy at Tufts University. She earned a BS in Civil Engineering in 2015 from MIT. She is interested in urban green spaces and transportation planning and hopes to work at a regional planning agency after graduating from Tufts. Her favorite Davis Square spot is The Somerville Theatre.

Introduction and Background

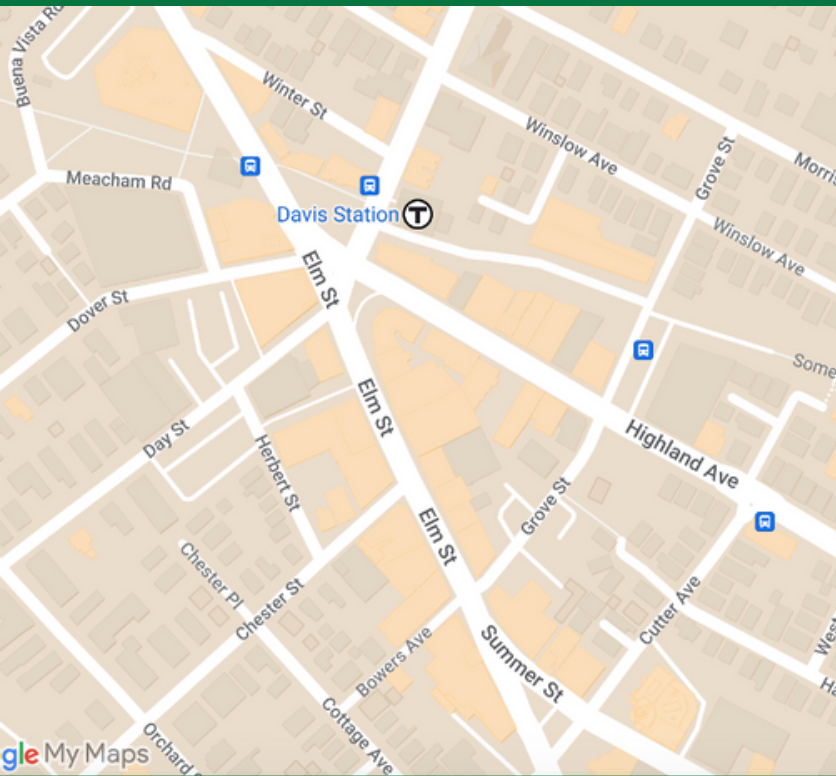
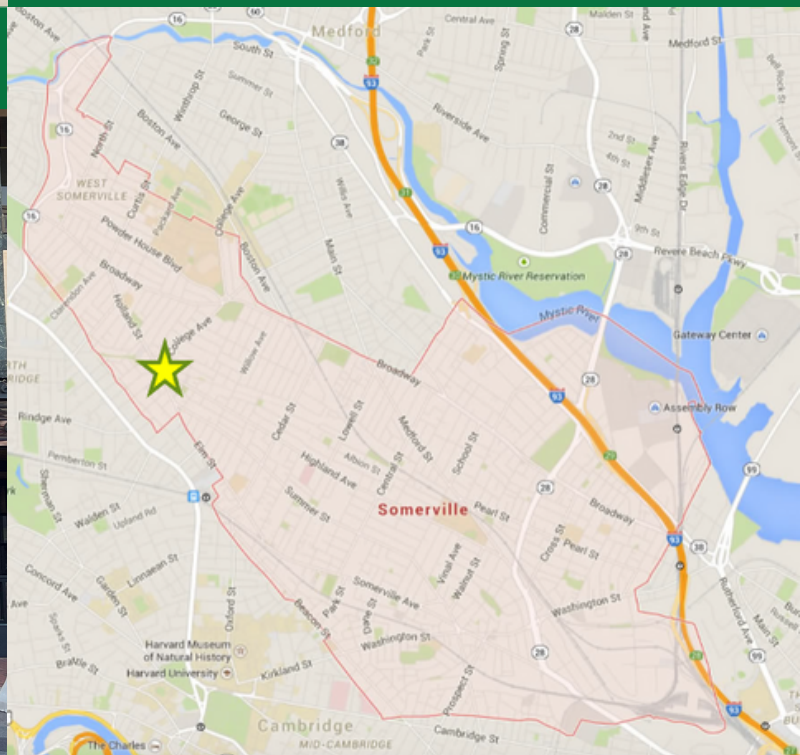


Figure 1. Map of Davis Square, Somerville, Massachusetts (above)



Figure 2. Somerville, Massachusetts, with the location of Davis Square indicated by a star (below)



Background

In late 2020, a group of Somerville advocates aiming to improve safety, equitable access, and beneficial use of the city's streets came together and formed the Somerville Alliance for Safe Streets (SASS). SASS has three priorities for Somerville's streets: safety, equitable accessibility, and beneficial usage. Pedestrianizing Davis Square, provided it is done accessibly, will be a major step for all three goals, and as such SASS is seeking ways to advocate for Davis Square's pedestrianization as well as support other advocacy efforts. Stephanie Galaitsi, our point of contact with SASS, is an environmental engineer, member of the Somerville Commission for Women, a mother of two young children, and an advocate for safe, multimodal street access.

In 2022, Stephanie offered her proposal as a potential field project for students in the Tufts University Department of Urban and Environmental Policy and Planning (UEP). Field Projects is a longstanding course at UEP that provides students with opportunities to work on real-world planning and policy initiatives by integrating theory and practice. Each spring, student teams work with a project partner to conduct research and analysis that helps advance the partner's goals. The Field Project team will aid SASS in examining and understanding current use conditions in Davis Square to provide actionable information for the City of Somerville to incorporate into any designs or plans to pedestrianize portions of the Square.

This project seeks to assess the current needs and conditions of Davis Square's streetscape. Through consolidating previous proposed plans and conducting our own fieldwork and outreach methods, our team seeks to explore pedestrianization as a way to increase livability and accessibility. It is our hope to help SASS influence the City of Somerville to prioritize providing safe and equitable access for all users of Davis Square.

Community Contexts

The Birth of Davis Square: From Rural Crossroads to Busy Streetcar Suburb

The history of Davis Square as a critical transportation hub began in 1850 with the arrival of Person Davis, a prominent grain merchant who established a large estate encompassing the intersection of Elm, Grove, and Morrison Streets (DARBI, 2010). When Person Davis established his home and business in the neighborhood, the area that would become Davis Square was largely rural and undeveloped. As the population of Greater Boston grew, a horse-drawn streetcar line opened in 1858 from Davis Square to Union Square, with later service to Lechmere. The opening of the Fitchburg Cutoff railroad in 1870, passing through Magoun Square, Davis, Alewife, and eventually through Central and Western Massachusetts, catalyzed growth in the neighborhood. The Fitchburg Cutoff carried numerous modes of rail transport, including freight service, long-distance sleeper trains, and regional rail. Soon, Davis Square quickly transitioned from a sleepy, rural community to a bustling streetcar suburb and an important rail junction for Greater Boston (Zhang, 2021). Horse-drawn streetcars were eventually replaced with a plethora of electric streetcar lines, some of which could enter the Green Line tracks near Lechmere and run directly to Downtown Boston. By the turn of the twentieth century, Davis Square had become an established commercial, residential, and transportation hub. The neighborhood's wide avenues were populated with an array of transportation modes; pedestrians, horse-drawn carriages, streetcars, and eventually automobiles bustled along Highland, Elm, and College Avenue while freight and passenger trains rumbled along the Fitchburg Cutoff (Zhang 2021).

The Rise of Automobile and Industrial Decline

In the early 1930s, nationwide trends in transportation favorability and funding led to a decline in streetcar and regional rail use. As streetcar systems became increasingly unreliable and congested with automobile traffic, the rapidly expanding middle class capable of affording automobile transport turned away from trolleys and trains (Sheehan, 1982). Simultaneously, the "auto-oil-rubber industrial complex" (a network of auto industry aligned corporations) overtook the rail companies as the primary influence in transportation development (Feagin & Parker, 1990). Davis Square and Greater Boston, like most urban areas in the United States, subsequently underwent immense transitions in transportation mode allocation.

Passenger service along the Fitchburg Cutoff ceased, and the streetcar lines closed and were replaced with trolleybus or bus services (Humphrey, 1974). Industrial decline in the 1940s and 50s, accelerated by the closure of passenger service on the Fitchburg Cutoff, led to business failures and a migration of Davis Square residents to the suburbs. Freight service, however, continued along the Fitchburg Cutoff until 1980, with the non-grade-separated tracks causing chronic traffic congestion at the College-Elm-Highland intersection (Zhang, 2021). A 1980 planning study noted that Davis Square experienced “a lack of business competitiveness among merchants, traffic congestion, inadequate parking, and an increasingly deteriorated physical environment” (DARBI, 2010).

Revitalization and the Red Line Extension: Present-Day Davis Square

With the neighborhood in crisis, community organizations and the Somerville Office of Planning and Community Development sought ways to revitalize Davis Square. In 1982, the Davis Square Task Force joined forces with the city to draft the Davis Square Action Plan. With the Red Line Extension through Porter, Davis, and Alewife under construction, the drafters proposed to spur business and residential growth without altering the neighborhood’s scale and character (Office of Planning and Community Development, 1984). The Action Plan and construction of the Red Line Extension are largely responsible for present-day conditions in the neighborhood; the plan called for the development of a multi-use path along the former rail line, the introduction of numerous small parking lots, and the designation of Davis Square as a revitalization district to qualify investors for state funding opportunities (DARBI, 2010). The MBTA Red Line Extension plan also incorporated a public plaza into the design of the stations, providing opportunities for people to congregate in Davis (Brown, 1980).

Since service began on the Red Line Extension in 1984, transportation and parking allocations conditions in Davis have remained relatively static. The revitalization that began after the rail line opened created many of the neighborhood’s characteristic bars, restaurants, and music venues (DARBI, 2010). During the COVID-19 pandemic, the Highland-Elm turning lane was permanently closed and parking along Elm Street was temporarily removed to accommodate outdoor dining (City of Somerville, 2022). Otherwise, no significant changes to the neighborhood’s transportation and parking systems have occurred since the enactment of the 1982 Action Plan.

Contemporary Davis

The confluence of multiple business-dense streets, bus routes, the MBTA Red Line, and the recently constructed Alewife Linear Park (also known as the Somerville Community Path) continue to situate contemporary Davis Square as a vital, multimodal transportation hub for Somerville and its neighboring communities. Still, much of the public space in the neighborhood remains devoted to cars, and that space is used by drivers who don't tend to stop in the square: an estimated 75% of vehicle trips in Davis Square are through traffic (City of Somerville). As a result, this road space primarily benefits drivers using the square as a route to another destination, rather than those that live, recreate, and do business in the Davis Square community. The large volume of vehicular traffic passing through the square daily, coupled with high pedestrian volumes and the intersection's complex traffic control schemes, prompts frequent conflict between transportation modes. The negative health and safety impacts of cars are well-documented. A Boston College study found that air pollution causes 2,780 deaths per year in Massachusetts, with 95% of air pollution resulting from the combustion of fossil fuels (Hayward, 2022). Cars are also a significant cause of pedestrian injuries and deaths; according to WalkBoston, at least 75 pedestrians died in car-related incidents in Massachusetts in 2021.

Recently, the City of Somerville and local advocates have been exploring options to pedestrianize portions of Elm Street (the main commercial artery in Davis Square), with the goal of returning Davis Square to an area safely and freely traversable on foot. Pedestrianization offers an opportunity to reclaim space from automobiles and promotes human-scale spaces. Generally defined as a closure of a street to motorized vehicle traffic, pedestrianization has emerged as a popular strategy to improve the walkability and livability of urban centers. During the COVID-19 pandemic, several cities across the United States implemented safe or slow street policies, closing streets off to vehicular traffic. While these measures and their outcomes varied from city to city, multiple studies found positive impacts from pedestrianization on economic performance and livability. Several health, safety, and economic benefits are linked to such efforts. Traffic accidents, street noise, and air pollution decreased while pedestrian traffic and economic performance increased (Soni and Soni 2016, Liu and Shi 2020). Repurposing streets to provide space for community, business, and recreation can revitalize urban spaces. Previous closures of Davis Square streets for annual events such as ArtBeat and the HONK! festival provides insight and a roadmap to a future that prioritizes humans over cars.

Plans For Davis Square

Pre Covid-19 Pandemic

Improvements to Davis Square have been sought out since the early 1980's. Following transportation development in the region, an increase in infrastructure, and a growing population, Somerville's Davis Square quickly became congested and not optimal for easy travel within and through it (OCPD, 1984). Consequently, the Davis Square Action Plan was proposed in 1984 and was to include office and retail development within Davis Square. The proposed action plan was to be a public-private partnership, to grow capital in Somerville while improving the city's public space. A parking garage holding 240 vehicles and a 15,000 to 20,000 square foot supermarket were included in new infrastructure to be built, while the rest of the action plan required upgrades to current infrastructure. Beginning in 1984, the city of Somerville also put rent controls on residential condominium housing to avoid the negative aspects of gentrification, more specifically the influx of wealthy homebuyers (OCPD, 1984).

Nearly thirty years later in 2012, after three years of planning and public meetings, the city released the SomerVision 2030 plan, the city's first comprehensive long-range plan identifying 39 goals to transform and update the city (Gehl, 2016). This action plan contained city goals and plans to follow and was updated in 2019 to SomerVision 2040. In 2015, Somerville's Office of Strategic Planning and Community Development (OSCCD) worked with Gehl Architects to document public life and space in Somerville; final notes from this exploration determined that the public wanted to see improvements in the public realms of Somerville (Somerville, 2021). The following year, Gehl Architects was brought back to work on a pilot project, shutting down the turn lane from Highland to Elm Street and adding Adirondack chairs to Seven Hills Park. Compared to the 2015 data, there was an increase from an average of 11.26 people to 21.16 people using the park in a 10-minute period. The pilot project concluded that people would take the opportunity to experience enhanced public spaces (Somerville, 2021). In the Fall of 2017, the City Council held round-robin style neighborhood meetings, addressing residents' most pressing concerns and moving forward, by asking them to propose actions that would directly address their issues with the Davis Square neighborhood plan and community development (Somerville, 2021). These meetings eventually resulted in what is now called the Davis Square Commercial Area Plan. In the winter of 2018, residents were presented with models of how their action plans could be feasibly carried out and were asked to rank the set of plans.

Somerville periodically produces public space reports to the public, such as “A Snapshot of Public Space, Public Life in Somerville, MA” in partnership with Gehl Architects. The published study sought to bring human-scale thinking to Somerville, by focusing city redesign on the pedestrian and cyclist (Gehl, 2016). Gehl Studios focused on creating mutually beneficial relationships between people’s quality of life and their built environment. Processes included volunteer training, public surveys, corridor mapping, and public workshops. This study effectively identified that Davis Square has consistent pedestrian movement throughout the day, increasing greatly on the weekends due to markets and events. This study also indicated that in 2015 there was a growing bike culture, however male cyclists greatly outnumbered female cyclists, likely due to safety factors and accessibility (Gehl, 2016). Davis Square saw pockets of ‘stickiness’ which is a rating of how many pedestrians are likely to stop and stand in an area versus walking through it. An engaging streetscape is important as it creates a welcoming environment for people walking around. This survey noted that Davis Square had a highly engaging streetscape, which included benches, street trees, and curb cuts, that allowed for increased positive activity in the area (Gehl, 2016). Positive activity includes the ability to use public space for leisure. The study concluded with three main points: ‘Somervillians’ chose to walk despite difficulties with accessibility; people want more open space, however there is already a lot of underused space; Somerville has good squares, however some are indistinct, unwelcoming, and hard to walk to; there is a growing bike culture, but only for the brave; and proper programming invites for more age and gender diverse street life (Gehl, 2016). The above synopsis of the 2015 Somerville Public Space, Public Life study allows for city planners to look at the current landscape of Davis Square and adjust according to accurate public opinion.

In 2019, the City of Somerville produced a comprehensive, 100-page Davis Square Neighborhood Plan that is no longer available in the public domain. This plan includes small-scale deliverables as well as long-term ideas, such as implementing a 4-way intersection in Davis Square. This implementation would require a full redesign of Davis Square in itself; however, it would allow for more public space and safer pedestrianization. It was noted that the Davis Square Neighborhood Plan is part of a much larger initiative, SomerVision 2040 which is a plan to improve sustainability, diversity, opportunity, connectivity, and community city-wide. This action plan dives into policies including carbon neutrality, open space and recreation, and urban forestry.

Post Covid-19 Pandemic

Recommended plans for Davis Square post-pandemic reflect the need to support small business owners, and to maximize the use of public open space in city regions (Somerville, 2021). The Davis Square Commercial Area Plan, presented by the City of Somerville, switched direction during the pandemic to focus their plan on street design and placemaking features necessary to support the public realm more effectively. Partially due to growth in public opinion on the matter, the plan expanded upon prior studies and applied them to civic spaces, outdoor dining and vending, pedestrian and bike safety, and public realm maintenance to improve visitor and resident experience (Somerville, 2022).

As of 2022, the City of Somerville has sought to improve crosswalks in Davis Square, aiding accessibility overall. New crosswalks and sidewalks will include accessibility curb ramps for pedestrians with disabilities and increase the ease of walking overall (Somerville, 2022). This project has also included the reconstruction of current sidewalks in locations such as Holland Street, Dover Street, Day Street, College Avenue, and Highland Avenue. Improvements included replacing the brick surface crosswalks with asphalt, promoting safety and longevity. Proposed sidewalk and crosswalk plans are expected to be completed in the spring of 2023 (Somerville, 2022). In addition to accessibility improvements, the city is promoting and reinforcing multimodal transportation in and around Davis Square. College Avenue and Holland Street lead into Davis Square from the northeast and northwest, and can be travelled by foot, bicycle, bus, or car. In early 2022, street improvements to College Ave implemented parking restrictions, redesigned sidewalks, and created new bike lines (Somerville, 2022). The city followed in the fall of 2022 with plan for Holland Street: resurfacing the roadway and sidewalks, creating projected bike lanes, and building traffic calming improvements (Somerville, 2022). The original plan did not include protected bike lanes, however they were added as a last-minute change when the current Mayor of Somerville was addressing Stephen Conley's death in a door-zone bike lane on Broadway at Packard Square. These improvements have been ongoing and will continue into 2023.

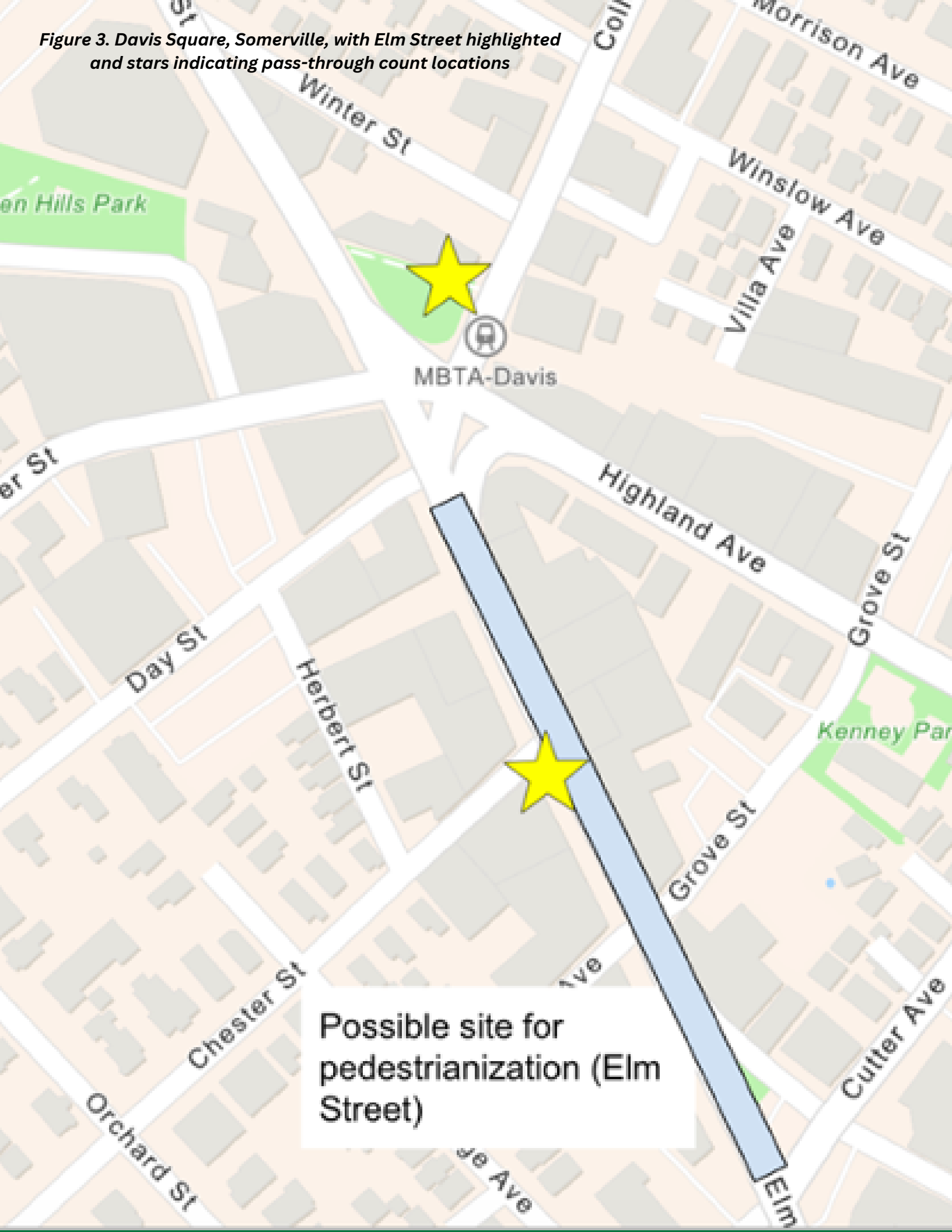
Development Plans in Somerville

The 7th Spoke Development Plan will include the creation of civic space in Davis Square, combining both old and new aspects of the square. This is a 120,000 square foot redevelopment focused on creating retail and office space that pushes the limits of innovation (7th Spoke, 2022). This project has two major public aspects: a rebuild along Elm Street and a 'Civic Plaza' to connect Elm Street and Herbert Street. Existing site conditions include a barren connecting corridor along Elm Street and the building space for the plaza that will be renovated. This development plan aligns with the goals of the Davis Square Plan, which allows for a more fluent transition along with proposed construction plans (7th Spoke, 2022).

Scape, an architectural group based out of North America, signed a \$10 million lease in 2019 to claim the block of retail storefronts in the heart of Davis Square (Adams, 2022). Originally purchasing this area to create new student housing, Scape will now be developing a life-sciences laboratory. Except for The Burren, located at 247 Elm Street, the development would redesign the face of the streetscape and buildings. This would include an 18–24-month construction period, with Scape abiding by all zoning regulations (Adams, 2022). While redevelopment is necessary for Davis Square due to outdated buildings, it is more interesting to note the switch in use of property. Due to the Covid-19 pandemic, needs have switched over to laboratory space rather than student housing, as market needs migrated.



Figure 3. Davis Square, Somerville, with Elm Street highlighted and stars indicating pass-through count locations



Possible site for pedestrianization (Elm Street)

Project Goals



Walk This Way: A Conditions and Needs Assessment of Davis Square, has **three major goals**:

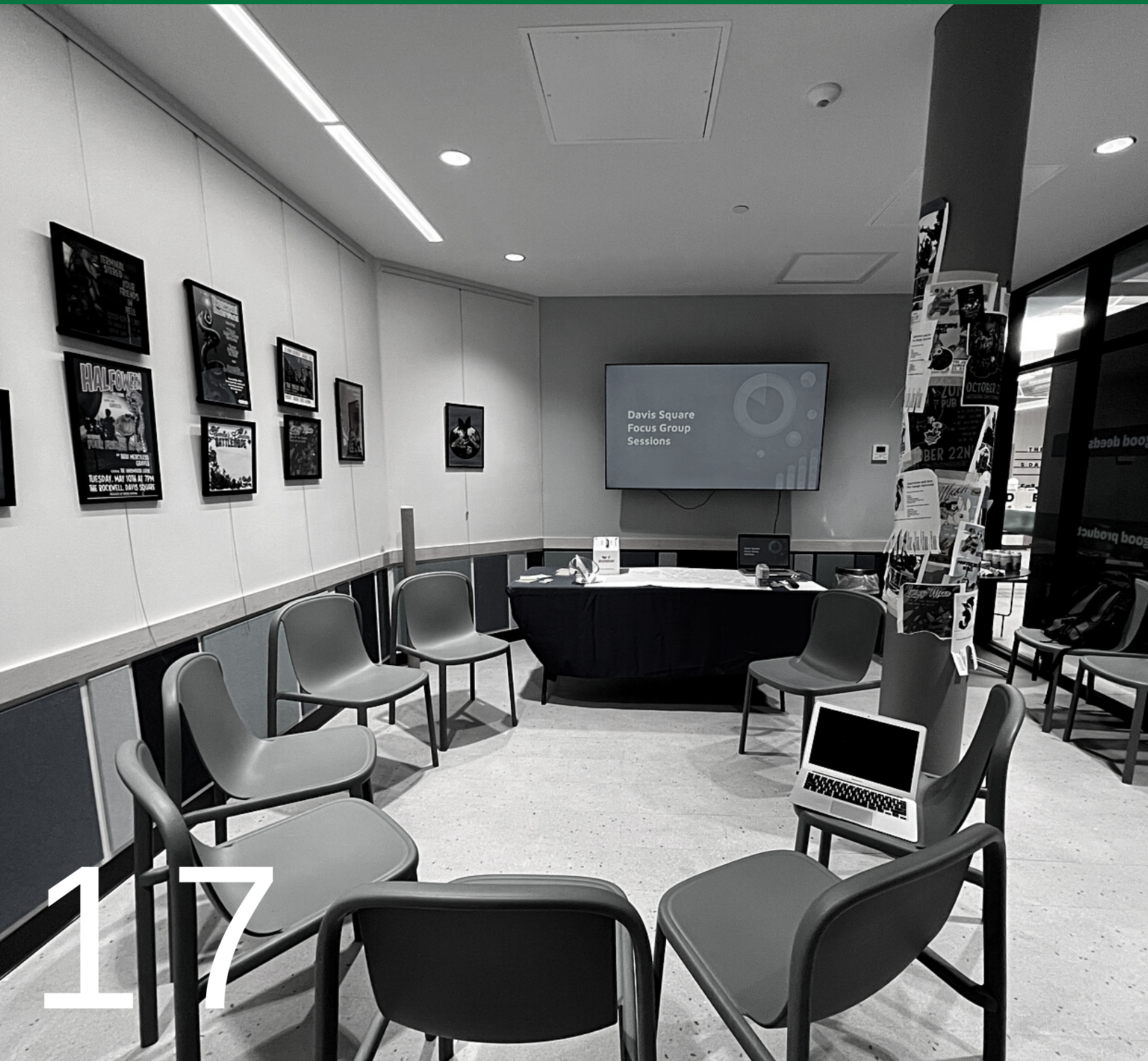
- Research analogous pedestrianization schemes and the general impacts of pedestrianization
- Gather and analyze quantitative and qualitative data on the current use conditions in Davis Square with an emphasis on safety
- Assess the potential impacts of pedestrianization on Davis Square

Ultimately, this project seeks to explore the following research questions:

- What are the current conditions and needs in Davis Square?
- Does pedestrianization align with those conditions and needs?



..... **Methods**



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Our project was focused on two fronts: 1) assessing the current conditions in Davis Square and 2) identifying how a proposed pedestrianization scheme might impact those conditions. All our methods were therefore intended to support one or both lines of inquiry. We collected and analyzed both qualitative and quantitative data.

Table 1. Types of data collected

	Quantative	Qualitative
Collected	<ul style="list-style-type: none"> -Pass-through counts -Observed violations 	<ul style="list-style-type: none"> -Surveys -Interviews -Focus Groups
Publicly Available	<ul style="list-style-type: none"> -Crash data -Parking data 	<ul style="list-style-type: none"> -Case Examples

Fieldwork

We conducted fieldwork in Davis Square throughout February 2023. This included counts of vehicles, cyclists, and pedestrians; observations of traffic violations; and counts of parking availability at different locations, times of day, and days of the week. This quantitative data will inform our analysis of current conditions in the area. The pass-through data provides information on what the most common transportation modes are, while the violation observations give us the tools to assess the frequency and severity of unsafe driving.

We collected pass-through data at two locations, at the crosswalk where the community path crosses College Avenue across from the Red Line station and at the crosswalk by the B-Fresh on Elm Street (See Figure 1). Our pass-through counts included observations of the numbers of motor vehicles, pedestrians, and cyclists that pass by. Motor vehicles included cars, buses, and commercial vehicles, and pedestrians included people walking along the sidewalk, people crossing the street, or people standing or sitting within the area. We made these observations in fifteen-minute sessions three times a day (morning, midday, and evening) on Tuesdays and Thursdays and twice over the weekend (midday and evening). If we needed to miss a weekday count for any reason, we made it up on a different weekday; the same was true for weekend counts. Due to the volume of cars and pedestrians at busy times, we purchased clickers to facilitate the counting process and protect the accuracy of our data.

We also observed drivers, cyclists, and pedestrians for violations. We made these observations in fifteen-minute sessions on the same schedule as the pass-through count sessions. When we only had one person available to make fieldwork observations at a given time, we prioritized taking pass-through counts so that we would have a large enough sample size to aggregate that data. This meant that we had fewer violation observation sessions. We took our observations at the College Ave crosswalk across from the T station and at the intersection of Elm Street and Day Street.

Survey

We distributed a survey with questions assessing people’s current use of Davis Square, their feelings on its current layout, and their priorities for changes. The survey questions (in the Appendix) solicited respondents’ perceptions of general needs for improvement and did not include any questions addressing pedestrianization specifically. The aggregate data from the survey provided us with qualitative data on current conditions to augment our quantitative data. We chose not to ask whether respondents supported a pedestrianization proposal for Davis Square to avoid guiding their responses.

The survey consisted of four demographic questions (age, race, gender, and income level), two questions asking participants how they currently interact with Davis Square (what transportation they most commonly use and what they most commonly do in Davis), a question asking them to rank their priorities for Davis, a question asking them to assess how well they think current features of Davis Square are functioning, and two text questions asking what they like about Davis and what they would change. This spread of questions resulted in a survey that took five to ten minutes to complete, which was important to us to encourage responses. We included a mix of multiple-choice questions and open-ended questions.



Figure 4. Survey flyer

We created the survey using Qualtrics. We distributed it online through Facebook, NextDoor, and Reddit and posted flyers throughout Somerville and Cambridge with a QR code link. We additionally asked our contacts at SASS and DavisNow, another advocacy organization, to share the survey with their members. Using the online platform Fiverr, we contracted with translation services to make the survey and the flyers available in Spanish, Portuguese, Haitian Creole, and Cape Verdean Creole. Our survey remained open for a month from March 1 to April 1.

Mapping

Using GIS, we analyzed and mapped publicly available crash data from MassDOT and data on motor vehicle, cyclist, and parking citations and maintenance requests from the City of Somerville. We identified dangerous areas in Davis Square, especially those with a high incidence of crashes involving a vehicle and a pedestrian. We were then able to compare these locations with the locations identified by survey respondents as pain points. This allowed us to build a comprehensive spatial understanding of the current safety conditions in Davis Square.

Literature Review

Our literature review included an overview of the general benefits and potential costs of pedestrianization. This formed the basis of our understanding of pedestrianization as a concept and informed the features we focused on in Davis Square for our conditions and needs assessment. We also reviewed relevant case examples of a variety of pedestrianization models, focusing on the successes and challenges of these pedestrianization schemes. As it is impossible to truly understand all the effects of a proposal before it is implemented, examining the impacts of analogous proposals in other areas was a valuable tool for making an estimation of what those impacts might be in Davis Square. Our literature review was therefore one of our most valuable tools in answering our second line of inquiry.

Interviews

We interviewed city officials, business owners, and members of local advocacy groups regarding their experiences with and feelings towards Davis Square. These interviews were semi-structured and focused on identifying the places in Davis Square about which people have the strongest feelings about (both positive and negative), their visions for the future of the Square, and concerns regarding pedestrianization. Since we focused on interviewing people who have unique and particularly relevant perspectives on Davis Square and pedestrianization, each interview varied slightly in content covered rather than using strictly uniform questions. We transcribed these interviews to assess the responses for patterns and important quotes.

While interviews included questions on current conditions and the general needs participants see for Davis Square, this was an additional opportunity to go further in depth with key stakeholders and experts on the impacts of a possible pedestrianization scheme in Davis Square. The effects of pedestrianization depend on many complex factors, but our interviewees had the relevant knowledge and experience needed to provide an informed and meaningful assessment. These interviews were an important method for answering both lines of inquiry.

Focus Groups

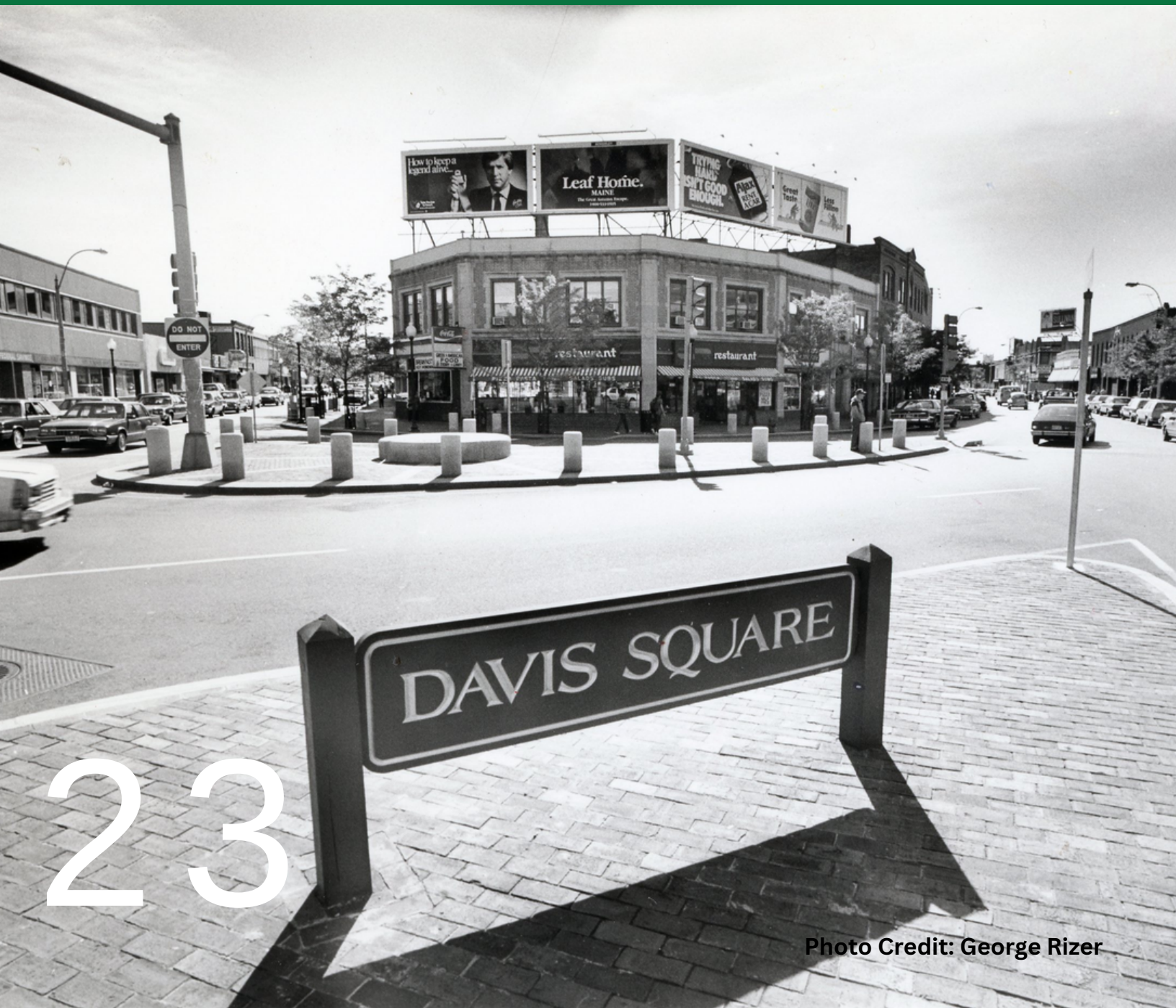
We conducted four focus groups with community members. To collect the contact information of interested community members, we included a link to a separate form in our survey (to preserve the anonymity of responses). We received much more interest in interviewing than we had anticipated. We therefore chose to pivot to a focus group model. We conducted four focus groups over three days from April 13-15. Each focus group lasted about an hour. Three groups were conducted over Zoom, while one was held in person at a registered community space in The Goods dispensary, a small business located in Davis Square. We had twenty focus group participants in total. To thank participants, we entered them in a drawing to win a \$25 gift card to Diesel Café.

Conducting focus groups allowed us to gain a deeper understanding of public perceptions surrounding Davis Square. Additionally, we included a collaborative mapping activity in the focus group sessions. Participatory mapping helped community members visualize, articulate, and communicate local spatial knowledge to advocate for change.



Figure 5. Photo from our in-person focus group mapping session

Literature Review



23

Overview of Pedestrianization

“Pedestrianization” is defined as the full or partial closure of a street to motor vehicle traffic. This includes streets that are permanently closed to vehicles, in which the space may be renovated to better serve other purposes; streets that are open to vehicles at some times and reserved for pedestrians and cyclists at others; and “transit malls” which are closed to private vehicles but remain open for use by public transit (Parajuli and Pojani, 2018; Yassin, 2019). Many popular instances of pedestrianization started by using part-time or temporary closures as a pilot program, particularly in the United States. Experiencing pedestrianization first-hand often leads to acceptance (Nieuwenhuijsen and Khreis, 2016; Parajuli and Pojani, 2018; Yassin, 2019).

Cities in the United States and across the world were centered around walking and non-motorized transportation methods for centuries before the advent of the personal automobile. In modern society, however, cars have become central to urban life. Pedestrianization as a response first reached a peak around twenty years after World War II (Ferial, 2020). The first permanent pedestrian malls reverted from motor vehicle use were enacted near-simultaneously in the United States (in Kalamazoo, Michigan) and West Germany (in Essen and Cologne) in 1960 (Ferial, 2020; Yassin, 2019). After becoming less common in the United States in the second half of the 20th century due to implementation failures of the early pedestrian malls, street closures have re-

emerged as popular strategies as part of the rising emphasis on “walkability” in the past twenty years. On the cutting edge of the trend, Hamburg, Helsinki, Madrid, and Oslo have all announced that they plan to become full or partly car-free cities by 2034 (Nieuwenhuijsen and Khreis, 2016)



Figure 6. Burdick Street Mall in Kalamazoo, Michigan (Photo credit: WWMT/Kalamazoo Valley Museum Collection)

Benefits

Health and Safety

Street closures reduce injuries and fatalities by limiting the interactions between motor vehicles and walkers or cyclists. A study of large-scale traffic calming and street closure initiatives in the Netherlands demonstrated that after the initiatives were implemented traffic crashes decreased by 80% (Schlabach, 1997). A similar study in the United Kingdom found that traffic crashes fell by 60%, including a 29% reduction in crashes involving cyclists and a 48% reduction in crashes involving children (Webster and Mackie, 1996 cited by Kumar and Ross, 2006). In addition to making walking safer, pedestrianization also makes walking more attractive by creating a dedicated space for walking and other forms of healthy transport such as biking.

Increasing walkability can have great effects on the health of city residents. Walking has been shown to be one of the most effective aerobic exercises and to lead to improvements in psychological health. Regular walking has also been linked to decreased risk of cardiovascular diseases and other health risks (Nieuwenhuijsen and Khreis, 2016; Pandit et al., 2021; Soni and Soni, 2016; Yassin, 2019). Though there is limited research quantifying the link between pedestrianization and increases in regular walking among the population, one study in East Belfast demonstrated that maximizing walkability in an area increased walking among residents on average by 36 minutes/person/week (Longo et al, 2015).

Economic

Pedestrianization has been established to increase business sales. A 1978 study of 100 pedestrianized streets around the world found that sales increased by up to 60% in cities in Austria, Germany, and Scandinavia (OECD, 1978 cited by Soni and Soni, 2016). A survey of business owners in Bangkok found that 47% of businesses reported an increase in sales and 35% reported no change following the implementation of pedestrianization (Kumar and Ross, 2006). In the United Kingdom, studies found that investments in walking and cycling infrastructure decreased retail vacancy by 17%, increased retail sales by 30%, and led to a five-fold increase in sales per square meter of bike parking (Carmona, 2018; Lawlor and Tasker, 2018; Raje and Saffrey, 2016).

A Toronto-based study found that buildings on underground pedestrian corridors have lower vacancy rates than similar buildings (City of Toronto, 1999).

A 2012 study in Portland, Oregon found that cyclists and pedestrians made more frequent visits to restaurants and stores while spending more over time than car drivers (Clifton, 2013). In 2018, New York City DOT analyzed the effects of street improvements such as traffic calming and street closures on seven locations in Manhattan, Brooklyn, and the Bronx. They found that local businesses often saw 50% increases in sales in the two years following improvements (NYC DOT, 2013). The construction of bike lanes was similarly found to increase sales in Salt Lake City, San Francisco, Seattle, and Los Angeles (Dunne, 2019; Jaffe, 2015). Pedestrianization can increase land values as increased walkability tends to make areas more appealing (Brambilla and Longo, 1977, cited in Soni and Soni, 2016). Finally, it often also reduces the costs of street maintenance, as pedestrians and cyclists place less stress on infrastructure and need less space than private vehicles do (Nieuwenhuijsen and Khreis, 2016; Soni and Soni, 2016).



Figure 7. Memorial Drive in Cambridge during traffic closure (Photo credit: Chris Rycroft)

Environmental

Cars significantly contribute to air pollution and removing all or most motorized vehicles from a street can therefore lead to a dramatic reduction in localized pollution. Where this is reduced, residents may experience fewer respiratory illnesses and reduced mortality (Pope et al, 2009; Giles et al, 2011, cited in Nieuwenhuijsen and Khreis, 2016). City areas may experience “micro climates” with artificially increased temperatures. Restricting cars can lead to a better microclimate and reduced temperatures (Soni and Soni, 2016). Finally, noise pollution has been linked to harmful health effects such as sleeping disorders and headaches. A study in Copenhagen found that ambient street noise decreased by 10-15 decibels due to pedestrianization (Brambilla and Longo, 1977, cited in Soni and Soni, 2016).

Livability

The most difficult to analyze but perhaps most important benefits of pedestrianization relate to the use of street space. By closing streets to vehicles, pedestrianization schemes reclaim them for people. Pandit (2021) writes that pedestrianization offers city residents “space to stay” in addition to space to pass through. These additional uses could include activities as diverse as children playing; people reading, napping, or studying; and people engaging in sports like badminton or frisbee (Nieuwenhuijsen and Khreis, 2016; Pandit et al., 2021; Soni and Soni, 2016). Pedestrianization also increases the flexibility of street space use; for instance, the area could be used by runners and cyclists in the morning before being set up for a street market in the afternoon (Banister, 2008). Dense urban areas often lack sufficient spaces for people to relax and recreate, increasing the importance of finding new spaces for these activities through creative strategies such as pedestrianization (Pandit et al., 2021).



Figure 8. Pedestrian zone in Madrid, Spain (Photo credit: Andrey Filippov)



Figure 9. New York City Open Street (Photo credit: NYC DOT)

Furthermore, reclaiming street space offers people social space. Full access to the streetscape allows people to gather for social activities such as meeting friends outside cafes or in public seating areas, playing informal games, having chance encounters and conversations, engaging in people-watching, strolling, and exploring, attending organized social events, and much more. Increasing walkability increases interactions within the community, contributing to social cohesion (Appleyard, 1980; Beatley and Manning, 1997; Engwicht, 1993). Research in San Francisco found that people living on low traffic streets had up to four times the number of social interactions as did people living on high traffic streets (Appleyard, 1982, cited in Nieuwenhuijsen and Khreis, 2016). Finally, closing streets to private vehicles can shape the physical street environment itself in positive ways. For instance, permanently closed streets are perfect candidates for richer landscaping along the edges of and within streets. Planting trees, shrubs and grass provides more green space (Nieuwenhuijsen and Khreis, 2016; Soni and Soni, 2016). Overall, pedestrianization creates an “identity” for a street that makes it more attractive for living, shopping, and recreating (Appleyard, 1980).

Concerns

Changing the existing character of a street through pedestrianization can negatively affect people who were accustomed to using it in its non-pedestrianized state, and those effects may not be felt evenly across all groups. Traffic that used to travel through newly pedestrianized streets may be rerouted to different streets that are ill-equipped to handle the additional load. This could negatively affect neighborhoods adjacent to the closed streets or increase congestion on arterial roads (Markovich and Lucas, 2011; Yassin, 2019). Property values and rents in pedestrianized areas tend to increase significantly, which may benefit property owners and landlords while displacing lower-income residents (Parajuli and Pojani, 2018). Businesses may be unable to receive deliveries efficiently or conveniently due to lack of access for delivery vehicles (Yassin, 2019). Finally, street closures could reduce accessibility to pedestrianized business districts for people who live outside the immediate district or people who use mobility devices, especially in areas where public transit is not readily available (Nieuwenhuijsen and Khreis, 2016).

The impacts of pedestrianization vary from place to place. For instance, while some street closures result in traffic reroutes onto nearby streets, others result in traffic “evaporation”, or the rerouting of traffic around the area entirely which does not lead to increased traffic impacts elsewhere (Nello-Deakin, 2022). The variance in outcomes causes challenges for different groups of stakeholders to come to a consensus on whether and how to implement it. Residents and motorists may oppose the idea of not being able to drive up to shops and businesses or having to take longer or more circuitous routes to their homes. Local business owners often believe (accurately or not) that most of their clients are car users or that car users spend more money than walkers or cyclists and that pedestrianization will therefore cause their business to suffer (Yassin, 2018). City officials may be hesitant to believe that pedestrianization could be beneficial and unwilling to take the risk of implementing a policy with unknown consequences.

Examples of Pedestrianization

While the setting and circumstances surrounding Davis Square are unique, analyzing outcomes of other pedestrianization schemes can prove to be useful. There are numerous examples of pedestrian zones throughout the United States. Exploring the outcomes of these efforts lends insight into the attributes and characteristics that lead to successful pedestrianization schemes. Case examples were selected to encompass a range of pedestrianization schemes from permanent to temporary. Pedestrian zones in warmer climates were excluded as less applicable for Somerville's cold winters. Due to the dominance of car-centric infrastructure in North American cities, examples encompass cities in the United States and Canada. Implementation and economic outcomes are of particular interest as we explore what makes a scheme successful or unsuccessful.

Church Street Marketplace - Burlington, Vermont

In the heart of Vermont's largest city lies the Church Street Marketplace, which serves as an exciting hub for commerce, activity, and community engagement. Since 1981, Church Street has transformed from a traditional commercial street to a permanent pedestrianized open mall. Almost 1.5 million people visit the thriving pedestrian zone each year, welcomed by over 100 restaurants and stores, street vendors, and entertainers. In 2022, the Marketplace was even rated as "#1 Best Public Square in America" by USA Today (Church Street Marketplace, 2023). The success of the Marketplace can be attributed to the city's use of strategic management and thoughtful planning.

The City of Burlington paid particular attention to the management side of the feasibility of a pedestrianization scheme for the Marketplace. The city conducted extensive research on similar developments and found that an independent organization responsible for the maintenance, operation, and promotion of the Marketplace would be the key towards superior performance (Yamaguchi, 1993). Thus, the Church Street Marketplace District Commission was conceived. Today, this City Commission continues to set policy for the Marketplace District and recommend the annual common area fee that is paid by businesses along the street (Church Street Marketplace, 2023).

A combination of thoughtful planning elements gave rise to the four-block Marketplace and the area's unique character as the "gem in the crown" of Burlington. Zoning helped promote ground-floor retail and upper-story office and residential uses (Redmond, n.d.), giving the Marketplace a desirable sense of place. To preserve the appearance of historic structures, building heights are restricted in the area (American Planning Association, 2008). This technique also creates human scale. The mall has a high pedestrian volume in an environment designed to be free of motor vehicle traffic, except for delivery trucks accessing the site only in the morning during off-peak hours (Redmond, n.d.). Trees, fountains, and benches are additional streetscape features found on all four blocks. The pedestrian mall style of Church Street Marketplace and its streetscape elements greatly enhance visitors' experience and reduce the environmental impacts caused by vehicular traffic.



Figure 10. Church Street Marketplace (Photo credit: Adam Fagen)

New York City Open Streets Initiative

During the COVID-19 pandemic, many cities in the United States turned to some form of an "open streets" initiative. These programs, also named "safe" and "slow" streets, restricted access or closed off roads to cars, providing space for recreation, dining, and other outdoor activities. New York City's Open Streets initiative, one of the most

expansive in the United States, was made permanent in 2021 by the New York City Council. With 83 miles of Open Streets at the program's peak in 2020, the program is a result of a multi-agency collaboration (Hu, 2022). However, as the COVID pandemic winds down, many participating streets have been scaled back or phased out. As of 2022, the total mileage of streets had been reduced to just over 20 miles (Hu, 2022). Participating streets restrict or ban traffic during limited hours for up to seven days a week, with many streets opting for weekend-only closures (NYC DOT, 2022). The program mostly uses movable barriers to demarcate Open Streets, but some streets have recently added permanent features and infrastructure to secure the newfound public space for the foreseeable future (Hu, 2022; Surico, 2022). Pedestrian plazas, curb extensions, and cement bollards for traffic control are just some of the new additions to these spaces.

Community groups and volunteers play an important role in the maintenance and operation of participating streets (Hazarika, 2021). Berry Street in Williamsburg and 34th Avenue in Jackson Heights have been cited as two of the most successful in the program (Hu, 2022; Hazarika, 2021). One common feature between these two streets is



Figure 11. 34th Street, New York City (Photo credit: Street Lab)

community participation and buy-in. The North Brooklyn Open Streets Community Coalition (NBOSCC) is responsible for much of the maintenance, barricade management, and oversight of Berry Street (Hazarika, 2021). This grassroots organization made up of community members and local organizations has a vested interest in the success of the street. Similarly, 34th Avenue is managed by volunteers (Hazarika, 2021). These community-led streets offer a stark contrast to streets being managed by the NYPD. NYPD-run Open Streets have not been as successful, with residents reporting inconsistent enforcement, a lack of maintenance, and over-policing (Cuba et. al, 2020). The NBOSCC worked to “minimize their engagement with the NYPD in the running of this program” (Hazarika, 2021). Having a sense of collective ownership encourages community engagement.

Both Berry Street and 34th Avenue have been praised for their vitality and public engagement. Similar to Davis Square, Berry Street is in a commercial corridor with large pedestrian volumes (Hazarika, 2021). Pre-existing businesses, retail, and restaurants play an important role in creating an attractive pedestrian environment, serving as a draw to the street. The Open Streets program was found to have encouraged sales, increased new business openings, and prevented business closures on participating streets. Open Streets corridors “significantly outperformed nearby control corridors” in these metrics and even increased sales by 19% above their pre-pandemic baselines (NYC DOT, 2022). This is consistent with previous studies finding economic growth in pedestrianized areas (Liu and Wei, 2020; Soni and Soni, 2016).

Montreal

Following experiments with temporary pedestrianization during the COVID-19 pandemic, Montreal committed to pedestrianizing twelve of its streets for summers through 2024 (MacDonald, 2022). One feature of this policy is a \$12 million investment over the period of three years into pedestrian infrastructure for these zones (Dicaire, 2022). This long-term commitment to pedestrianization combined with financial backing for multiple summers allows for longer-term planning in these spaces. Outcomes of these interim car closures help provide proof of concept and a blueprint for more permanent projects. A city-commissioned study found from 17% to 86%



Figure 12. Rue Saint-Paul, Montreal (Photo credit: Tony Webster)

increases in foot traffic in streets closed to cars in Montreal (Freitas, 2022). If the desired objectives of these schemes are not achieved, it is feasible to make adjustments or simply end the program at little to no cost.

We examined one participating street, Rue Sainte-Catherine West for insight on implementation and business relations. In the summer of 2020, the street was partially pedestrianized Monday through Thursday, and fully pedestrianized from Friday through Sunday. The rollout of this project occurred quickly during the pandemic, and thus lacked robust consultation processes and feedback from stakeholders (Kohn, 2021). However, during a survey of 503 users of the Sainte-Catherine pedestrian space, 81% reported high satisfaction with the new street design (Kohn, 2021). Business sentiment towards the pedestrianization effort is lukewarm, with most businesses expressing dissatisfaction with levels of consultation and communication from authorities (Kohn, 2021). To increase local business buy-in to such projects, improving process-related elements of planning and increasing communication appears to be a good first step. Notably, most businesses had an “initial neutral stance... that were

a quickly converted to positive or negative as the project evolved,” suggesting that business attitudes regarding pedestrianization are influenced by initial phases of implementation (Kohn, 2021).

Rue Sainte-Catherine West is currently undergoing redevelopment to dedicate the majority of the street’s footprint to pedestrians. Improvements include sidewalk widening, removal of on-street parking, planting over 30 trees, and new street furniture (Making Montreal, 2022).

Memorial Drive - Cambridge, Massachusetts

On a typical weekday, Memorial Drive serves as a busy thoroughfare through Cambridge, MA along the Charles River, with traffic volumes of up to 30,000 cars/day (Milneil, 2019). On summer Sundays (and sometimes weekends), however, a 1.5 mile stretch of the road is closed to cars, leaving the space open for runners, walkers, bikers, and gatherings. These street closures were first envisioned over 40 years ago. They were implemented by the non-profit The Riverbend Park Trust in collaboration with the Department of Conservation and Recreation, under whose jurisdiction the road falls. In 2022, the section was closed from 8am to 7pm on Saturdays and Sundays between late April and late November (Riverbend Park Trust, 2022).

A 2022 study carried out by Tufts University Urban and Environmental Policy and Planning students in collaboration with the Human Architecture and Planning Institute surveyed passers-by about the Memorial Drive closure. Interviewees had mixed opinions of the closure, with some saying that they were inconvenienced by the traffic reconfiguring. However, most interviewees had favorable opinions and said that it is “an excellent resource for the local community” (Hu et al, 2022, p.47). Two-thirds of interviewees said they would be in favor of a permanent pedestrianization plan for the street. The study also found that pedestrians felt more anxiety when walking along the road when it was open to cars versus when it was closed (Hu et al, 2022).

Results

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A grayscale image of a hand holding a pen, pointing at a city map. The map shows various building footprints and streets. The number '36' is overlaid in white on the right side of the map.

36



bfresh
market

bfresh
market

bfresh
market

self
serve

get in
here!

fresh
market

Fieldwork Observations

Pass-Through Data

We collected pass-through data in discrete fifteen-minute intervals at two different locations in Davis Square: College Avenue opposite the Red Line and bus station and the intersection of Elm and Chester streets. Both locations were chosen for their high density and their differing roles in the Davis Square streetscape. The College Avenue location is a critical multimodal transit intersection, with high rates of vehicular, pedestrian, cyclist, and public transportation uses. The Elm and Chester intersection is located at the center of the Elm Street commercial district and features a variety of shops, bars, restaurants, entertainment venues, and several un-signalized crosswalks.

We conducted a combined total of 46 total counts at the two locations between February 7th, 2023, and March 2nd, 2023. These occurred regularly on Tuesdays, Thursdays, and sporadically on various Fridays, Saturdays, and Sundays. Our data collection times for weekdays occurred at 8:00 am, between 11:00 am and 1:00pm, and between 4:30 pm and 6:00 pm. We chose these times to collect data during morning and evening rush hours, in addition to the midday “lunch break” and shopping period. Because of the absence of rush hour traffic on weekends, we limited data collection on these dates to midday (11:00 am-2:00 pm) and evening (7:00-9:00 pm) time slots to reflect Davis Square’s commercial and entertainment uses.



Figure 13. Locations of pass-through counts conducted within the Davis Square neighborhood

Following data collection, we analyzed the pass-through numbers by location, time of day, and transportation mode. Mean, median, standard deviation, and margins of error were calculated for each transportation mode. We also aggregated counts by location, time of day, and combined modes (pedestrian, motor vehicle, and cyclist) to determine the percentages of each transportation mode pass-throughs at various times of day, and all times of day combined by location. In conducting pass-through observations, we decided to count pedestrians crossing the street, as well as people sitting or standing at the location, separately from those who were walking without crossing. We did this to obtain data on crosswalk use. In the figures below, all pedestrian counts (including those sitting or standing, crossing the street, or walking through without crossing the street) are combined.

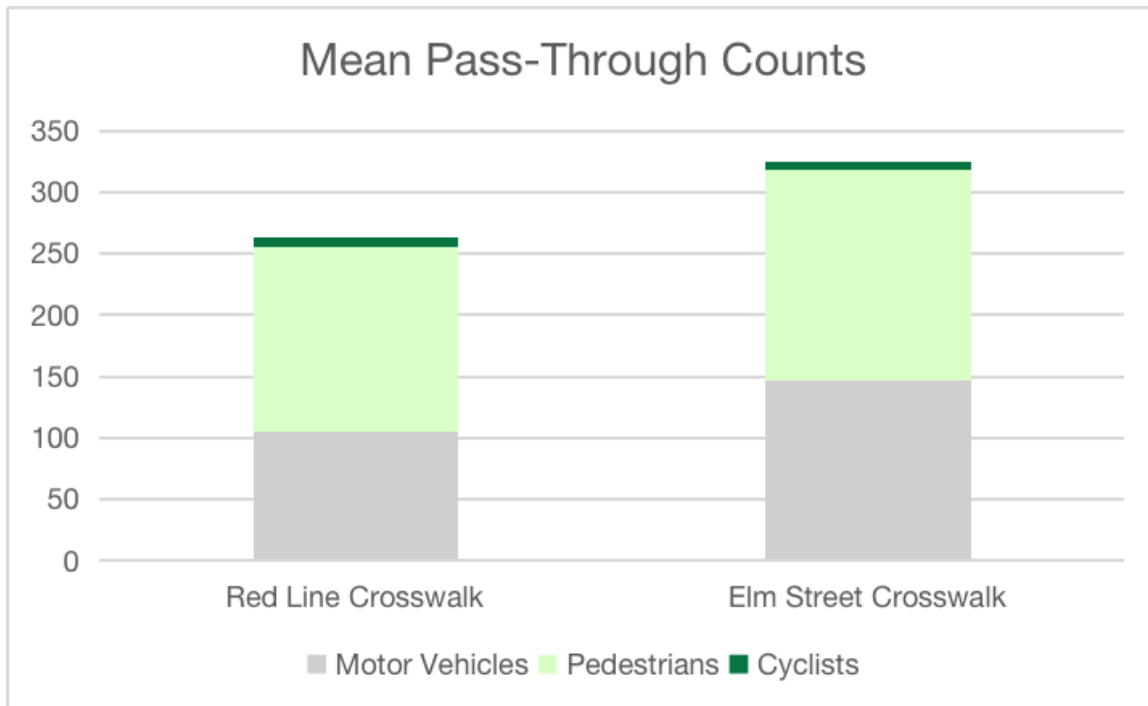


Figure 14. Overall mean pass-through counts for all times and days of the week compared across locations

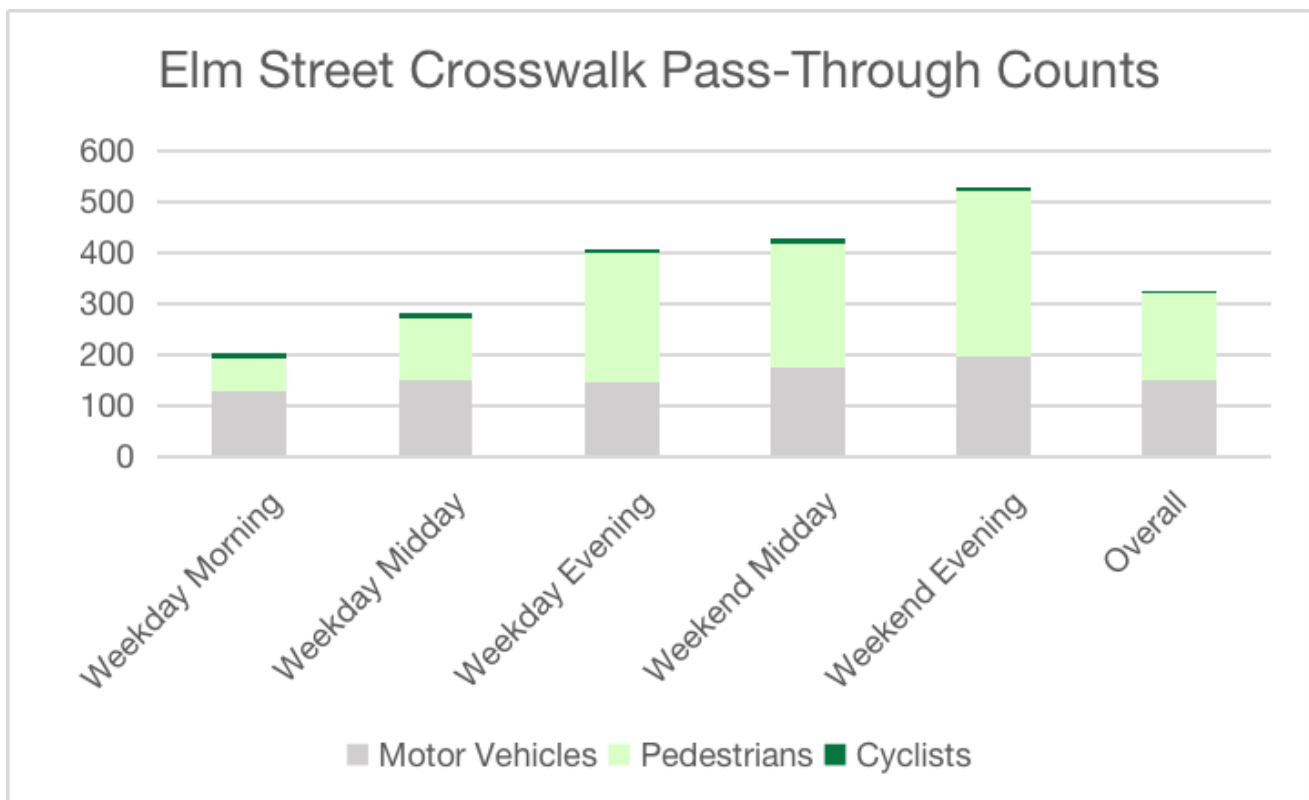


Figure 15. Mean pass-through counts on Elm Street, compared across times and days of the week

College Avenue

A diverse mix of transportation modes pass through the College Avenue intersection. During morning and evening rush hours, vehicular traffic comprises approximately 60% of pass-throughs, while pedestrian and cyclist traffic make up the remaining 40%. Pedestrian totals include people crossing through the intersection, passing along either side of College Avenue on the sidewalks, and those sitting or standing by the MBTA station and the public plaza. During midday times on weekdays, there is a slightly higher rate of pedestrian traffic at the intersection, but motor vehicles remain the dominant transportation mode. The crosswalk between Davis Square Plaza and the Red Line station is one of the most-trafficked areas of the intersection by pedestrians, and volume peaks when buses and trains unload passengers. On weekends, the composition of pass-through traffic is approximately 55% motor vehicle and 45% pedestrian and cyclist. The higher rate of pedestrian traffic reflects Davis Square's weekend shopping and entertainment uses, as traffic from commuters passing through the square bound for other destinations is largely absent.

Elm Street at Chester Street

The Elm and Chester intersection is situated near the core of the Davis Square commercial district and is home to a diverse array of restaurants, bars, shops, entertainment venues, banks, and other services. The largest portion of motor vehicle traffic occurs during morning rush hour, with 62.5% of pass-through traffic consisting of cars, buses, or commercial vehicles. During weekend middays, the ratio of pedestrian and cyclist traffic to vehicle traffic is nearly equal. 53.6% of traffic comes from motor vehicles, with the remaining 46.4% consisting of traffic and cyclist pass throughs. During weekday evening rush hour and all weekend times, pedestrian traffic outnumbers motor vehicle traffic by approximately 20-25%.

The high rates of pedestrian traffic on weekends and weekday evenings reflect the neighborhood's use as a destination for dining, bars, and entertainment. While there is a similar or slightly larger number of motor vehicles passing through the intersection during weekday evenings than during weekday mornings or afternoons, there is a significantly greater amount of pedestrian traffic. This may be caused by the joint uses of Davis Square during weekday evenings; through commuter traffic blends with pedestrian traffic caused by people visiting restaurants, bars, and music venues. On weekends, when there is limited commuter traffic, pedestrian traffic outnumbers vehicle traffic.

Traffic Violations Data

In addition to collecting pass-through data, we also recorded traffic violations at two different locations: the crosswalk on College Avenue at the Red Line station and the complex intersection of Highland Avenue, Elm Street, College Avenue, Dover Street, and Day Street. We recorded all types of traffic violations, including violations committed by cyclists and pedestrians, within fifteen-minute intervals. Although jaywalking at un-signalized crosswalks is legal in Somerville, and therefore is not a legal violation, we decided to record jaywalking instances to determine the effectiveness of the signaled crossings at College Avenue and the Red Line station and at Elm Street and Day Street. Additionally, we timed all vehicle and pedestrian signal cycles at the six streets converging in the center of Davis Square; for complete times, please reference Appendix D.

College Avenue

The most frequently observed traffic violations at College Avenue and the Red Line station consisted of personal or commercial vehicles driving in the bus lane and red-light violations at the signaled pedestrian crossing. There is a sequence of two lights on southbound College Avenue by the Red Line. The first set of lights occurs at the pedestrian crossing and cycles approximately every 1 minute and 35 seconds. Pedestrians receive a brief window of 20 seconds to cross between the Red Line and Davis Square Plaza. Vehicles traveling southbound on College Avenue also receive a 20 second green light window to clear the crosswalk after pedestrians have crossed. Both vehicles and pedestrians must wait at red signals for approximately 1 minute and 15 seconds. The second set of lights is approximately 50 feet south of the first set and controls the intersection of College Avenue and Highland Avenue. Frequently, vehicles run the first set of red lights at the pedestrian crossing and stop in between the two sets of lights. Furthermore, the first set of lights turns yellow while the second set is still green, which may contribute to driver confusion and vehicles speeding through the crossing. We observed several instances of near misses, during which vehicles ran the first sequence of lights when pedestrians were authorized to cross. Conversely, many pedestrians choose to jaywalk because of the crosswalk signal's timing.

Similarly, the bus lane design at the College Avenue and Highland intersection appears to confuse drivers. Many drivers utilize the bus lane to make right turns on to Elm Street, even though personal vehicles are seemingly not allowed to turn from it. Sometimes, a vehicle will attempt to turn right from the bus lane while another turns right from the travel lane, creating a conflict. Google Street View data shows that the bus lane was posted as a right-turn lane as late as March 2022; however, the right-turn arrow is currently painted over. Inadequate signage and long-term use of the bus lane as a right-turn lane may contribute to drivers' use of the bus lane as a turning lane. We also observed drivers and commercial vehicles stopping in the bus lane to load or unload passengers and merchandise, which occasionally disrupts the flow of bus and cyclist traffic in the dedicated lane.

Davis Square Center



Figure 16. Map of traffic flow in Davis Square center; map created by project team

The five-street intersection at the center of Davis Square features a complex traffic flow pattern governed by aging signals and confusing zipper merge systems. The city removed a curved slip lane from Highland Avenue to Elm Street during the COVID-19 pandemic to provide outdoor dining and public space. Consequently, traffic turning from Highland to Elm must make a 90-degree left at a signalized intersection. Removing the turning lane shifted the location of the zipper merging point from Elm Street to College Avenue; traffic turning from Highland to Elm is allowed to turn left when there is through traffic flow from eastbound Holland/Elm Streets, creating a complicated merging pattern. We frequently encountered instances of right-on-red violations at the Day Street and Elm Street intersection (7 motor vehicle and 3 bicycle instances), frequent jaywalking at the same intersection (36 instances), poor zipper merging technique in traffic turning from Highland Avenue to Elm Street (7 instances), and illegal double-parking/loading-unloading on Elm Street (14 instances).

Day Street turning to Elm is signed as a “no right on red” to modulate traffic flow and provide a signalized crossing for pedestrians. Since the pedestrian and vehicular green light cycles occur simultaneously, drivers must yield to pedestrians. When there is a break in oncoming traffic on Elm Street, drivers may violate the posted no right-on-red law. In some instances, we observed near misses with pedestrians or pedestrians with the right-of-way being cut off while crossing both Elm and Day Streets. Twice, drivers on Elm Street stopped at a green light to let pedestrians cross Elm Street at Day Street even though pedestrians did not have the right-of-way. This disrupted traffic flow and is evident of driver confusion in interpreting the intersection’s signaling system. Pedestrians also jaywalk often at this intersection, suggesting that the signal timing may favor vehicular traffic over the ease and timeliness of pedestrian crossings.

We observed driver confusion and disorderly merging among vehicles turning from Highland Avenue to Elm Street. Visible driver confusion often manifests through erratic stopping or failing to properly yield to through traffic on Elm Street. This largely occurs when turning traffic from Highland Avenue and through traffic on eastbound Elm/Holland Streets have simultaneous green signals. While through traffic has the right-of-way, turning traffic will sometimes cut in front of the through traffic; this creates vehicular conflicts and disrupts the rhythm of the zipper merging pattern. The merging pattern is occasionally further complicated by jaywalking pedestrians.

Lastly, we observed frequent double parking of passenger vehicles and delivery trucks on Elm Street. This primarily occurs during midday weekday times when it is common for businesses to receive deliveries and in the evening when rideshare vehicles pick up and drop off passengers at bars and restaurants. While there are several dedicated loading and unloading zones on Elm Street, delivery and rideshare vehicles frequently stop outside of these zones for convenience.

Observed Deficits in Physical Infrastructure



Figures 17 & 18. Observed deficits in brick sidewalks and crosswalks

In addition to the aging signal system in the center of Davis Square, there are other existing deficits in physical infrastructure that impede pedestrian, cyclist, and vehicle access through the neighborhood. The aging brick sidewalks present difficulties for the elderly, disabled people, and people pushing strollers or pushcarts. These pathways are particularly dangerous in snowy and icy conditions. At several locations along Elm Street, we observed missing or upheaved bricks that create physical hurdles for wheelchairs, strollers, and pushcarts. We observed several instances of people using wheelchairs, strollers, or pushcarts using the Elm Street vehicle travel lanes to traverse the street, since the existing sidewalk infrastructure fails to meet their needs. This poses significant safety threats to already-vulnerable pedestrians and road users. On freezing days, accumulated water also turns into patches of black ice on the surfaces of the brick sidewalks.

The poor maintenance of crosswalks on Elm Street presents further issues for users with impaired mobility, and some crosswalks are difficult for drivers to see. The height of curbs on Elm Street, and the steep angles and narrowness of existing crosswalk curb breaks are untraversable for wheelchair users and difficult to access for people with strollers or pushcarts. Furthermore, the paint on several crosswalks has significantly faded, making them difficult for drivers to visualize at night or in adverse weather conditions.

Parking Discussion and Data

Davis Square has one of the highest on-street parking space densities per street mile in Somerville (Somerville, 2022a). The City of Somerville collaborated with Nelson\Nygaard Consulting Associates to conduct a Davis Square Parking Utilization Study in 2013. While parking policy, metering, and conditions in Davis Square have changed since 2013, we can draw insights from this study when considered in conjunction with our own parking observations and more recent city-wide studies. The 2013 study found that overall utilization of both on and off-street parking is around 61% during weekdays and 55% on weekends (Somerville, 2013). A 2022 city-wide study found that 62% of Somerville's public parking is occupied during the commercial peak period (Somerville, 2022b), although it should be noted that many of the remaining spaces are occupied by temporary loading zones. In line with our observations, on-street demand remains fairly consistent on weekdays, with peak utilization during evening hours. The report concludes that there is "still spare capacity even during peak evening hours" (Somerville, 2013).

Notably, this 2013 study found that private parking spaces only reach 31% utilization on Saturdays and 57% on weekdays (Somerville, 2013). A 2019 study of the nearby Holland Street/Broadway Corridor recommended partnerships with private parking lots to offset potential impacts of on-street parking removal (Somerville, 2019). Opening private lots to the public takes advantage of preexisting infrastructure to alleviate demand for parking. Brad Rawson, the City's Director of Transportation and Infrastructure, stated that Somerville is working to a requirement that new parking developments must be made available for public use (Rawson, 2023). The City further acknowledges that "front-door on-street parking at all destinations cannot be guaranteed" as it moves towards a more equitable and accessible transportation

network (Somerville, 2022c). With most curb space in Davis dedicated to personal vehicle access, improving the equity and accessibility of Davis can start with reallocating this space.

With the recent growth of delivery, food pickup, and ride-share trips, Davis Square has seen an increase in demand for loading and drop-off space. Even with the addition of new loading zones in the square, we observed over 50 incidents of improper loading or double-parked personal and commercial vehicles on Elm Street during our data collection period. These vehicles impeded traffic and created an unsafe and congested environment for other users of the corridor. The prevalence of double parking indicates a need for additional enforcement, loading capacity, or new curb management practices.



Figure 19. Map showing the density of parking enforcement violations in Davis Square (Somerville, 2023; map created by the project team)

Survey Responses



Demographics of Respondents and Relationship to Davis Square

We received 687 responses to our survey. Most respondents were white young adults. Of the respondents, 87% identified as white, 6.5% as Asian, and 3% Hispanic/Latino. This is in line with Davis Square's demographic makeup: according to US Census data, the Davis Square neighborhood is 84% white, 6.5% Asian, and 3.5% Hispanic (Statistical Atlas, 2018). However, the City of Somerville is 69% white, meaning Somerville's BIPOC communities are underrepresented. Respondents identified as 49% female, 46% male, and 5% as non-binary or other. The majority of respondents were in the age range 18-39, with 32% in the age range 40-59, and 16.5% in the age range 60+ (Figure X). With 54% of all Somerville residents falling in the age range of 18-39 (Statistical Atlas, 2018), our responses accurately reflect this demographic. However, adults of ages 40-59 are overrepresented in our survey compared to Somerville as a whole, making up 32% of respondents but only 20% of Somerville's residents. A breakdown of income can be seen in Figure X.

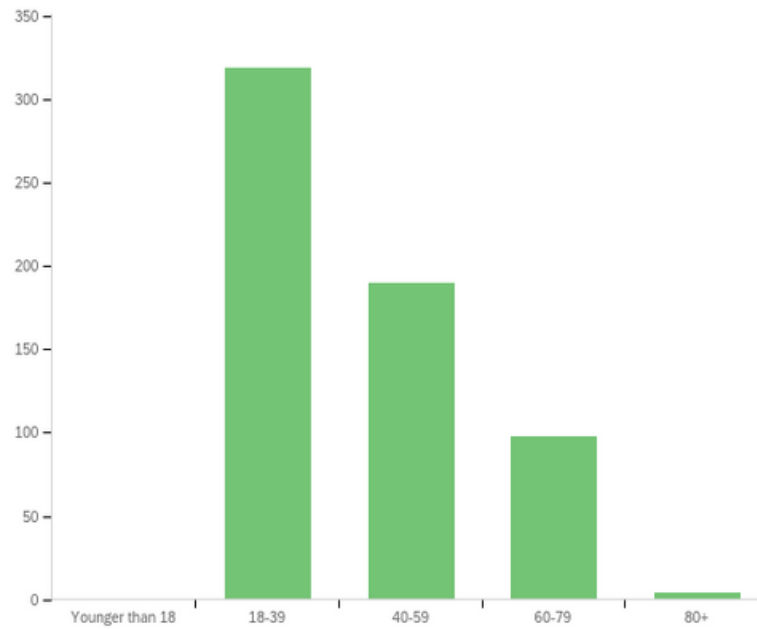


Figure 20. Ages of survey respondents

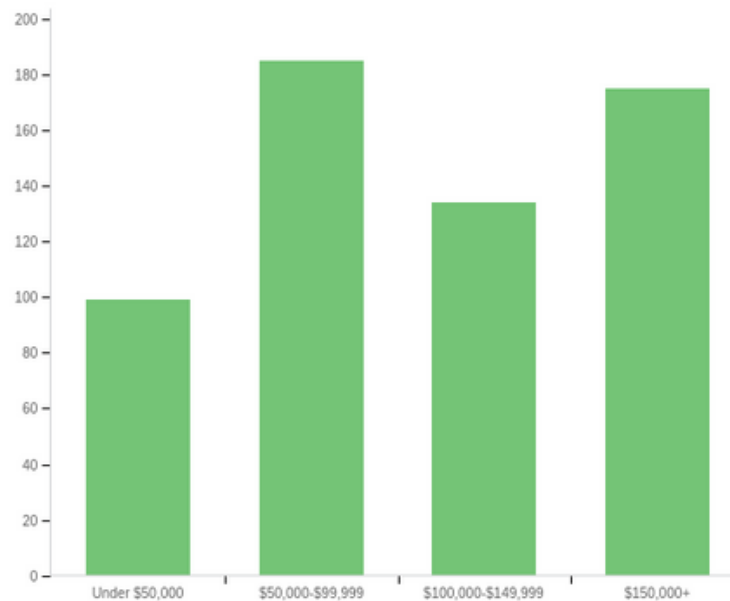


Figure 21. Household income levels of survey respondents

We asked participants about their most common uses of the Square and the types of transportation used to get to and through Davis Square. Of our survey respondents, 70% come to Davis for recreation, while 48.6% live in and around Davis Square. Only 16.3% of respondents said that they typically pass-through Davis without stopping, listing walking and personal vehicles as their most common pass-through transportation methods.

Given the large amounts of pass-through traffic through the square known for vehicles, this group is likely underrepresented in our survey results. While nearly half of respondents stated they use a car to access Davis Square, 89% of participants regularly walk to and through Davis Square. As for other modes of transit, 54.5% take the Red Line, 34.4% bike, and 32% ride a bus. Respondents were able to select more than one option, allowing them to select all modes of transportation they “normally use” to access and navigate the Square.

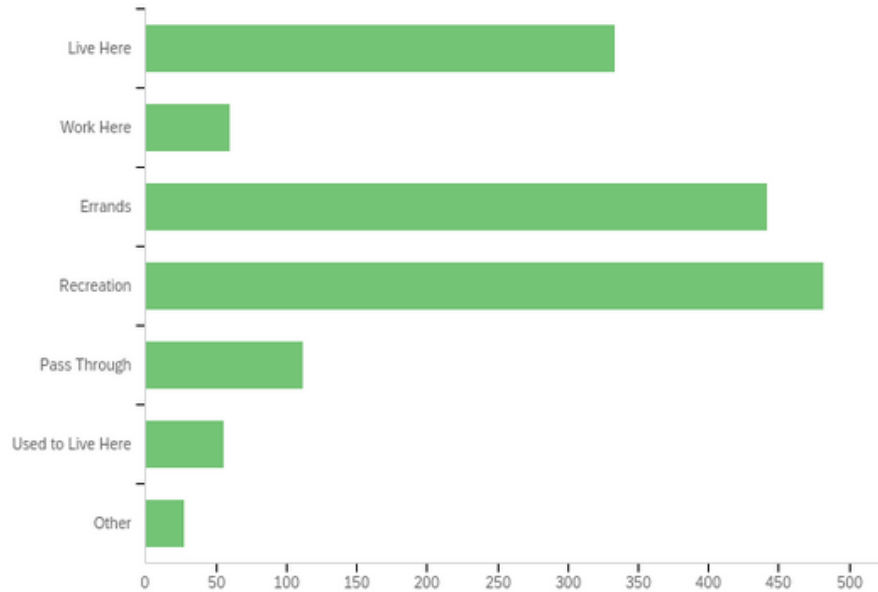


Figure 22. Survey respondents' relationship with Davis Square. Respondents were allowed to select more than one answer

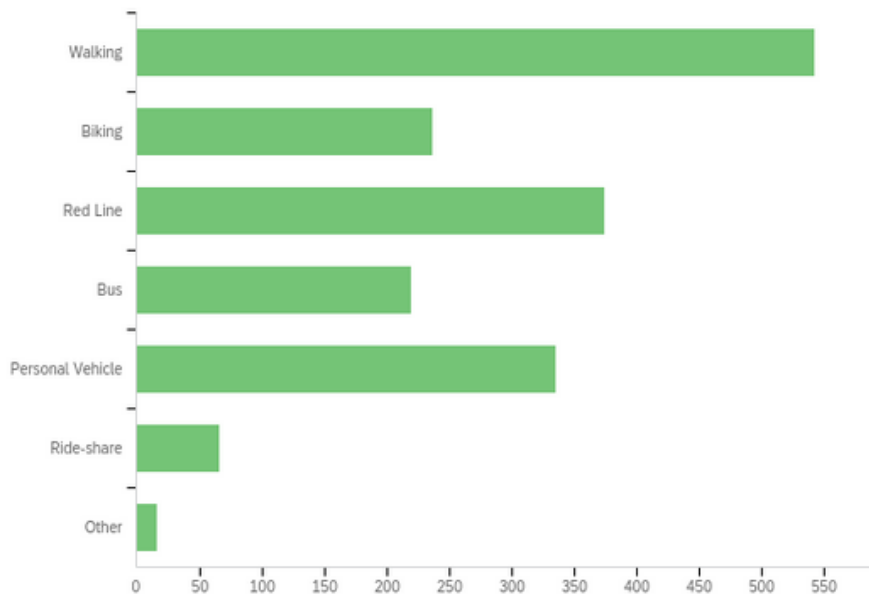


Figure 23. Survey responses to the question "What transportation do you normally use to/through Davis Square?" Respondents were allowed to select more than one answer

The demographics of survey respondents were related to what they did in Davis Square and how they got there. Respondents 60 years of age and older were significantly less likely than younger groups to say that they came to Davis Square for errands or for recreation or that they used to live there. Only 60% of older respondents said that they came to Davis Square for recreation, compared to 79% of respondents overall. However, older respondents were significantly more likely to say that they came to Davis Square for other reasons (specifying medical appointments, visiting friends, and owning rental properties as some activities). They were also significantly less likely to say that they walked or took public transportation to Davis Square compared to younger groups. However, when it came to transportation, the largest divide was between respondents in the 18-39 age group and those in other age groups. Younger respondents were significantly more likely to say that they normally biked to Davis Square and that they did not drive a personal vehicle. In the 18-39 age group, 46% of respondents said that they normally biked to Davis Square, compared to 39% of respondents overall. About the same number of respondents in that group, 48%, said that they drove a personal vehicle to or through Davis Square, compared to 55% overall.

Income levels also played a role. Respondents who reported incomes of \$100,000 or more were significantly more likely to live in Davis Square and significantly less likely to say that they used to live there. Of respondents with incomes of \$150,000 or more, 61% said that they lived in Davis Square, compared to 53% of respondents overall. The groups that were the least likely to live in Davis Square were respondents of any age with incomes of less than \$50,000 and respondents above 40 at the middle income level (between \$50,000 and \$100,000). This indicates that living in Davis Square is out of reach for many people. Perhaps correspondingly, the income groups that were most likely to say that they used to live in Davis Square were respondents in the 18-39 age range who reported incomes of \$50,000-\$99,999 and respondents in the 40-59 age range who reported any income under \$150,000. Fourteen to 20% of respondents in those age and income categories said that they used to live in Davis Square, compared to 9% of respondents overall.

Income levels were not significantly correlated to activities respondents did in Davis Square besides living there, however they were correlated to what transportation methods respondents used. Respondents with incomes of \$150,000 or more were significantly more likely to walk or bike to Davis Square. On the other hand, respondents with incomes of less than \$50,000 were significantly more likely to take the bus and less likely to drive a personal vehicle. Age was more strongly correlated to transportation method than income level, though the two pattern sets were compounding. For instance, the group that was by far the most likely to bike to Davis Square was 18-39 year olds with incomes of \$100,000 or more, with 55% of that group reporting biking to Davis Square regularly. Walking, which was universally popular among all groups, was comparatively less popular among 60-79 year olds with incomes of less than \$150,000. Of respondents in this group, 77% reported that they regularly walked to Davis Square, compared to 89% of respondents overall.

Another variable strongly correlated to transportation method was whether a respondent lived near Davis. Respondents who said that they lived in Davis were statistically more likely to say that they walked, took the Red Line, or drove a personal vehicle to or through the square than respondents who did not live there. For instance, 95% of Davis residents listed walking, 71% listed the Red Line, and 55% listed a personal vehicle as a transportation method they normally used. In contrast, of respondents who said they did not live in Davis Square, 82% normally walk, 40% take the Red Line, and 43% drive a personal vehicle. The percentage of respondents who listed other forms of transportation, including biking and taking the bus, was not statistically different between residents and non-residents. Some trends related to residency, such as respondents who lived near Davis Square being significantly more likely to walk or take the Red Line as a primary mode of transportation, held true across age and income groups, while others did not, such as being significantly more likely to drive a personal vehicle. Respondents younger than 40 were statistically less likely to say that they drive a personal vehicle regardless of residency status. Other trends correlated to age and income were also unaffected by the spread of respondents who live in Davis Square. For instance, 60% (or 33 out of 55 respondents) of 18-39-year-olds with incomes above \$100,000 who did not live in Davis Square reported that they normally biked, compared to 47% of respondents in that age and income group who did live nearby (43 of 91 respondents).

Only 59 survey respondents said they work in Davis Square, and 66% of respondents who work in the square also said that they live there. Respondents who worked but did not live in Davis Square were statistically less likely to say that they walked or took the Red Line to the area. They were also less likely to list biking as a normal transportation, were slightly more likely to take the bus, and drove personal vehicles at similar rates as did respondents overall. These trends for workers were independent of income, as half of respondents who worked but did not live in Davis Square fell into the \$100,000-\$149,999 income level.

Priority-Ranking Opinion Questions

One opinion question asked participants to rank their priorities for Davis from 1 to 6. The options for priorities were “Pedestrian Convenience and Safety”, “Dedicated bus/bike lanes”, “Smooth traffic flow”, “Easy access to parking”, “Outdoor space for recreation/events”, and “Outdoor space for businesses”. Of these options, “Pedestrian Convenience and Safety” was the priority listed first by the most people by far, with 72% of people listing it first. Correspondingly, that choice had the lowest standard deviation. The choices with the highest standard deviation were “Dedicated bus/bike lanes”, followed by “Easy access to parking” and “Smooth traffic flow”. This indicates that more people disagree about these three priorities than about the first one. Overall, respondents ranked the options in the following order: “Pedestrian Convenience and Safety”, “Outdoor space for recreation/events”, “Dedicated bus/bike lanes”, “Outdoor space for businesses”, “Smooth traffic flow”, and “Easy access to parking”.

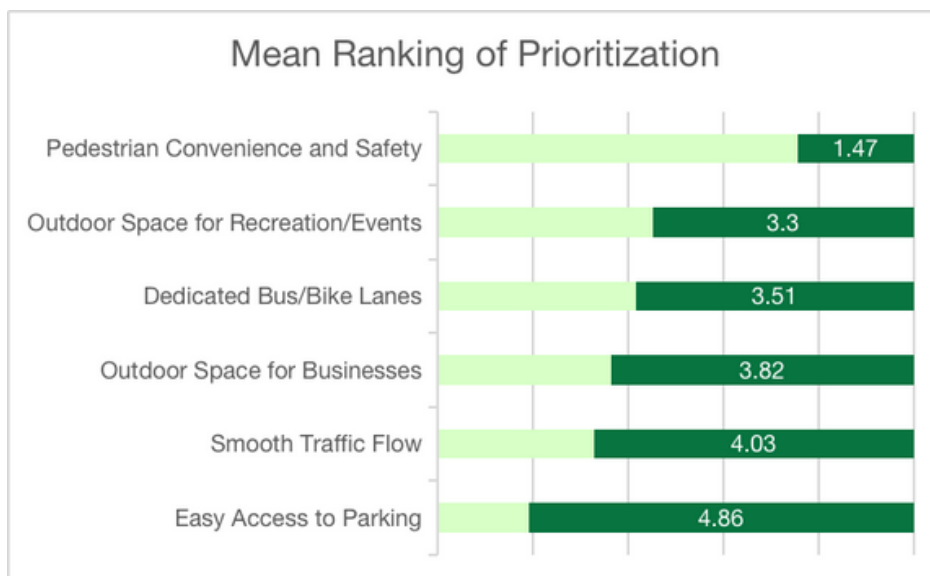


Figure 24. The six priorities listed in the survey question, in order from most to least popular. Data labels are the average rank by respondents.

Field	Mean	Std Deviation	Variance
Pedestrian convenience and safety	1.49	0.93	0.86
Outdoor space for recreation/events	3.25	1.31	1.72
Dedicated bike/bus lanes	3.57	1.60	2.55
Outdoor space for businesses	3.73	1.30	1.69
Smooth traffic flow	4.08	1.45	2.12
Easy access to parking	4.89	1.46	2.14

Table 2. Respondents' priorities for Davis Square. Low mean numbers indicate a higher prioritization. Higher standard deviation indicates a wider range of opinions for that category

Respondents were divided by age and income on their prioritization rankings. Age was statistically significant in relation to bus/bike lanes, parking, and traffic flow.

Respondents in the 18-39 age group ranked bus/bike lanes far higher and smooth traffic flow and easy access to parking far lower on their list of priorities than did older respondents. Interestingly, patterns of standard deviation were reasonably even across age groups, indicating equal levels of disagreement at all ages. The exception was in the ranking of “pedestrian convenience and safety” by respondents in the 60-79 age group; respondents in that group had a higher standard deviation for that choice and on average ranked it lower on their list of priorities than did other age groups. Income level was correlated to traffic flow, parking, and outdoor space for businesses at a statistically significant level. Respondents with incomes above \$150,000 were more likely to rank low smooth traffic flow and easy access to parking and to rank high outdoor space for businesses on their list of priorities compared to other income groups.

Respondents within the same age group at different income levels often disagreed significantly. While respondents in the 18-39 age group with incomes over \$100,000 tended to rank smooth traffic flow very low on their list of priorities, respondents in that age group with lower incomes tended to rank smooth traffic flow in the middle of their list. (Younger respondents at all income levels did, however, agree that parking was not a priority).

Younger respondents at higher incomes were also more likely to rank outdoor space for businesses higher on their priority list than younger respondents at lower income levels. Another notable trend related to respondents in the 60-79 age group with incomes of \$100,000-\$150,000. This group ranked both bus lanes and pedestrian safety significantly lower on their priority list than did other groups, with only 13 out of 27 respondents from that group ranking pedestrian safety first and 12 respondents ranking bus and bike lanes last on their priority list.

We also asked respondents how well they thought various aspects of Davis Square were working currently. Respondents thought that the commercial and business aspects of Davis Square were working well on average. They considered all other aspects to be working at an acceptable level, with traffic and parking considered to be working the least well overall by respondents. Age was correlated at a statistically significant level with how well respondents thought the commercial and business aspects of Davis Square are working currently. Younger respondents were significantly more positive about these aspects, with 47% of respondents in the 18-39 age group saying that commercial and business spaces in Davis Square were working well or very well, compared to 29% of respondents in other groups.

Open Text Response Questions

We asked two open text questions on the survey: “What aspects of Davis Square do you enjoy the most?” and “What would you like to see changed about Davis Square?” We coded the responses to these questions in Qualtrics to identify common themes by tagging and grouping them into the discrete categories shown on the two charts on the following page.

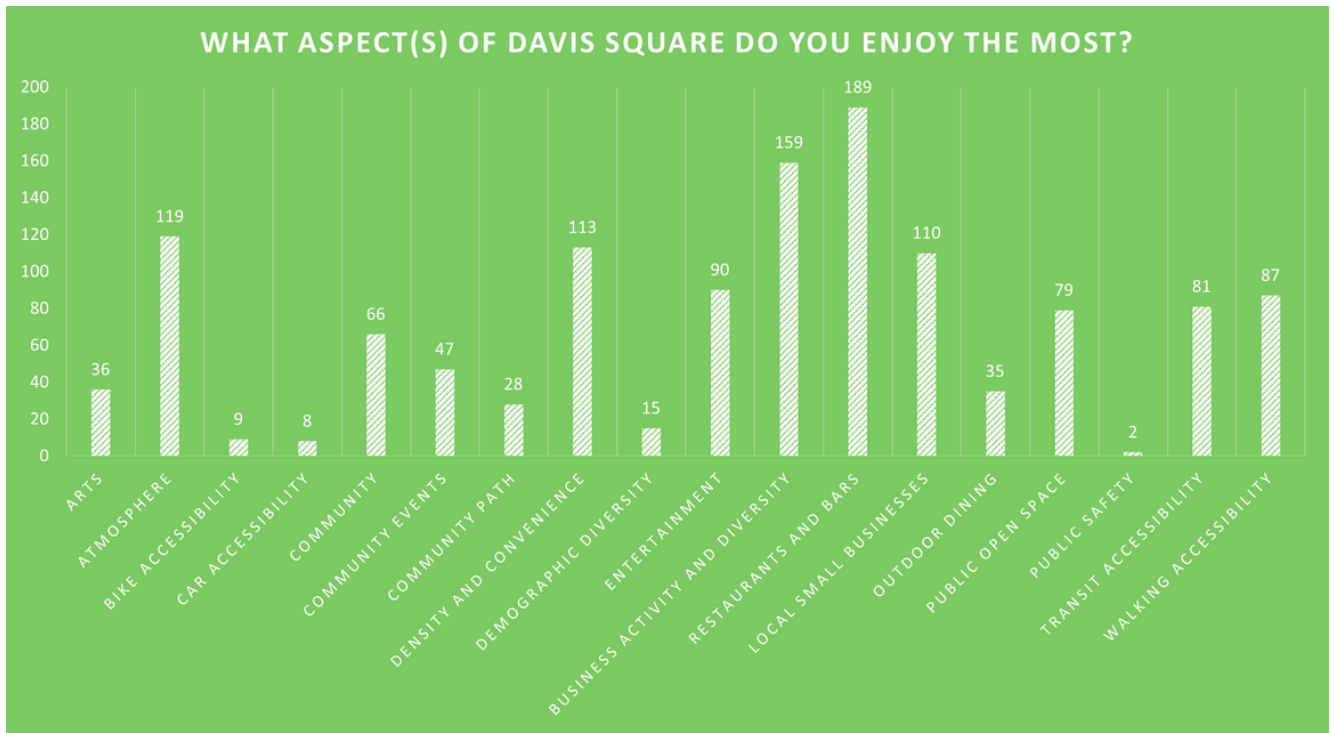


Figure 25. Total mentions of elements of Davis Square that respondents enjoy

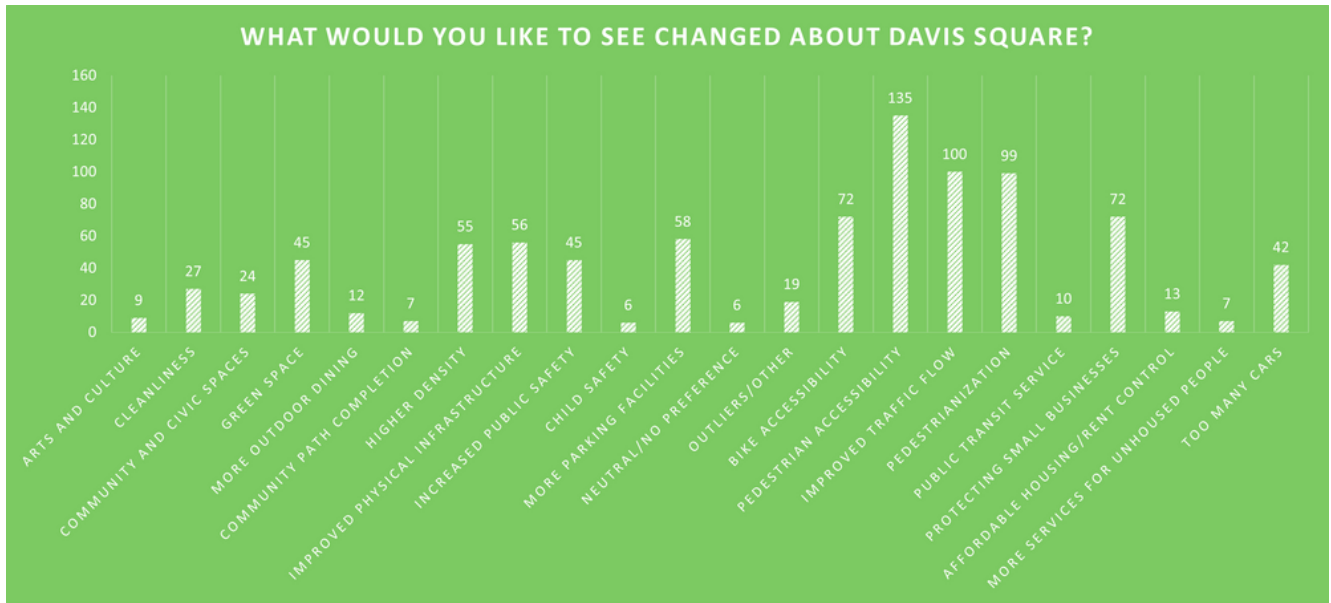


Figure 26. Total mentions of elements of Davis Square that respondents dislike or would like to see changed

For aspects that respondents enjoy about Davis Square, we found that the most common responses mentioned restaurants and bars (189), the high level of business activity and business diversity (159), the neighborhood's intangible character and atmosphere (119), density and convenience (113), local small businesses (110), entertainment venues (90), walking accessibility (87), transit accessibility (81), public open space (79), and the neighborhood's sense of community (66). The least common responses mentioned were diversity (15), bike accessibility (9), car accessibility (8), enjoying nothing about the neighborhood (6), and public safety (2).

Respondents generally feel favorably towards the existing wealth and diversity of small business options and neighborhood convenience and enjoy the less tangible characteristics of the neighborhood including its community, character, and atmosphere. We observed less of a diversity of opinion from respondents to this question than to the following one, indicating some consensus regarding the favored elements of the neighborhood. There were scant responses indicating satisfaction with current bike accessibility, parking allocation, or public safety, signifying that respondents may view the current functioning of these aspects negatively. This may also be a product of our question phrasing, as people do not come to Davis Square to “enjoy” these aspects; rather, they expect them to be functioning.



Figure 27. Artwork commenting on neighborhood change in Davis Square. Photo courtesy of the Tufts Daily

Regarding things respondents would like to see changed about Davis Square, the top five responses indicated a need for greater pedestrian accessibility (135), better traffic flow (100), full pedestrianization of Elm Street (99), improved bike accessibility (72), and preservation of the neighborhood’s small business landscape (72). Four of the five top responses indicate a need for improved transportation infrastructure of all modes, indicating dissatisfaction with the neighborhood’s current conditions from pedestrians, cyclists, and drivers alike. Responses to this question were more varied than the first, with a much wider spread of outlier or unclassifiable responses. Responses noting the degradation of the neighborhood’s existing physical structure, including traffic signals, brick sidewalks, general cleanliness, and roadway design were common. Respondents were split between those wanting more pedestrian-oriented amenities like outdoor dining or noting that there are “too many cars,” and those believing that current parking allocation is inadequate. People who favor better parking allocation and vehicular traffic flow were less likely to discuss a desire for a pedestrianized Davis, or expanded pedestrian amenities. Fifty-six responses indicated a need for improved public safety, which includes responses mentioning improved lighting and perceived high rates of public drug and alcohol consumption.

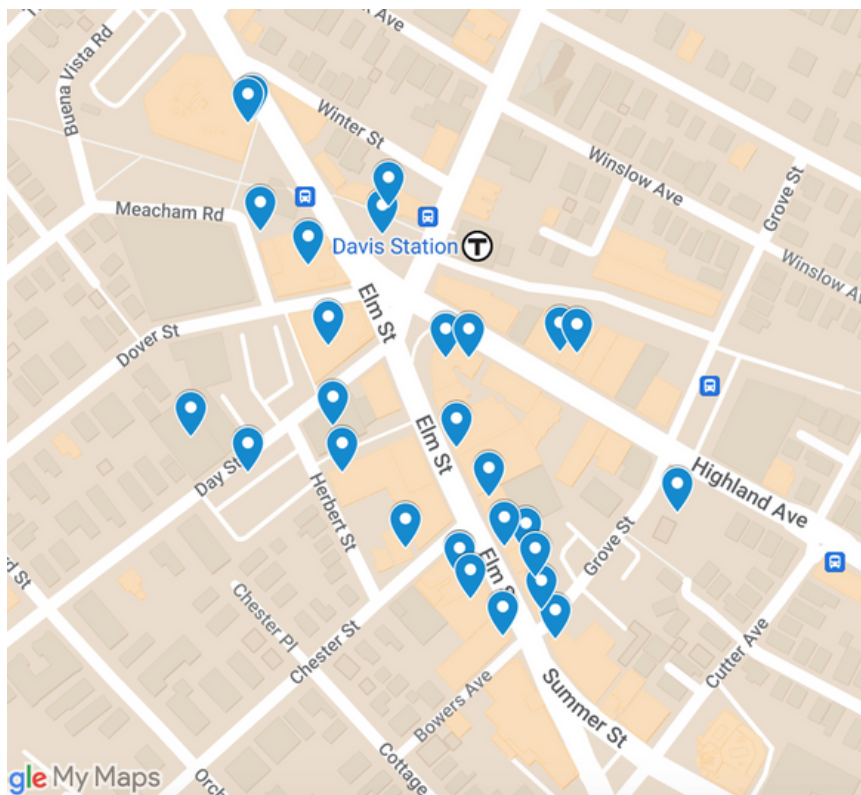


Figure 28. Map of Davis Square locations mentioned with positive associations

Some respondents mentioned specific locations in Davis Square as part of their open text responses, with either positive or negative associations. Most (76%) of the locations mentioned in a positive light were businesses. By far the most frequently mentioned location was the Somerville Theatre, with 36 positive responses. Other businesses that multiple respondents listed as something they liked about Davis Square were B-Fresh, CVS, Goodwill, McKinnon's, the Burren, and When Pigs Fly. Respondents also cited the public services and open spaces as locations they liked in Davis. Statue Park, the Somerville Public Library, the post office, and the farmer's market hosted in the Day Street parking lot were all mentioned in multiple responses. In contrast, most locations that respondents said they wanted to see changed were intersections. The crosswalk across Dover Street where it enters the Square was the most referenced location, as multiple respondents said that it is an unsafe crossing for pedestrians and confusing for pedestrians and motorists alike. Respondents also listed the intersections of Day Street and Elm Street, Highland Avenue and College Avenue, and Highland Avenue and Elm Street as problem spots.

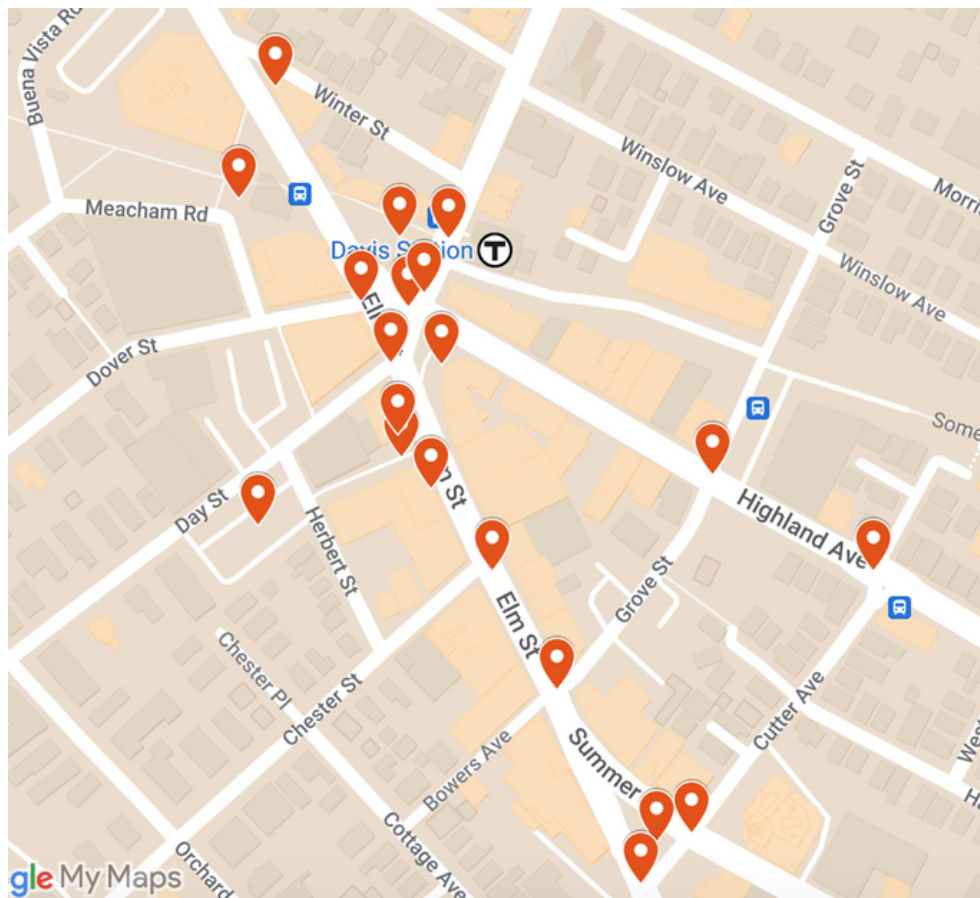


Figure 29. Map of Davis Square locations mentioned with negative associations

By far the most controversial location was the closed slipway in front of Mike's Food and Spirits. Equal numbers of respondents mentioned it with negative associations as did those with positive associations. Positive respondents commented that they like the space being reserved as a gathering place, and that the closed street makes it easier to navigate the square. Negative commenters were more split, with some who are frustrated with the new traffic flow and others who are in favor of the closure but feel it is unfair for the space to be reserved for one business only.

Finally, we looked at groups of respondents who live in Davis Square, work in Davis Square, or pass through Davis Square without stopping as well as respondents who identified as people of color to see if their responses to these opinion questions differed from survey responses overall. We found that respondents who live in Davis Square ranked smooth traffic flow slightly higher and easy access to parking slightly lower on their priority list compared to respondents overall. Their responses for the open text questions and their opinions on how Davis Square is functioning currently matched responses overall. Respondents who work in Davis Square ranked smooth traffic flow, easy access to parking, and outdoor space for businesses slightly higher on their priority list than did respondents overall. They ranked pedestrian convenience and safety and dedicated bus/bike lanes lower. Respondents who work in Davis Square were also slightly more likely to think that pedestrian convenience and safety in Davis Square are currently functioning very well than were respondents overall.

Respondents who reported that they generally pass through Davis Square without stopping also had somewhat different responses than did respondents overall. They were statistically significantly more likely to say that they were biking, taking the bus, or using a personal vehicle as their normal transportation mode. Perhaps as a result, pass-through respondents were more likely to rank dedicated bus/bike lanes, smooth traffic flow, and easy access to parking higher on their priority list than were respondents overall. They ranked outdoor space for recreation/events and outdoor space for businesses lower. They mostly mentioned the business diversity and the density and convenience of Davis Square as the things they liked best about it. Finally, respondents who identified as people of color were slightly more likely than white respondents to say that pedestrian safety and convenience in Davis Square was functioning well currently; otherwise, their responses did not differ significantly from those of white respondents.



CHASE

ELM STREET TAPROOM

258

b'fresh market

b'fresh market

COROLLA

Spatial Analysis



Crash Data

We obtained data on crashes in the Davis Square area starting in 2002 from the Massachusetts Department of Transportation. In the past 20 years, there have been 2,061 crashes within a 2,500-foot radius of the College Avenue/Highland Avenue/Elm Street intersection.

Most crashes involved two motor vehicles, while only 17% of crashes involved a non-motorist. Of the crashes that involved a non-motorist, about half were between a motor vehicle and a pedestrian, and about half were between a motor vehicle and a cyclist. About two thirds of crashes resulted in property damage only with no injuries.

However, crashes that involved a non-motorist were significantly more likely to result in injuries, with 83% of crashes that involved a non-motorist resulting in injuries.

Both fatal incidents during this period involved an interaction between a car and a pedestrian.

Most crashes, including crashes that involved non-motorists and those that did not, occurred at intersections. The intersection of Grove Street and Highland Avenue was the most common location, with other common ones being the main Davis Square intersection, the intersection of Grove Street and Elm Street, and the intersection of Cutter Street and Elm Street.

Crashes by Year and Crash Severity

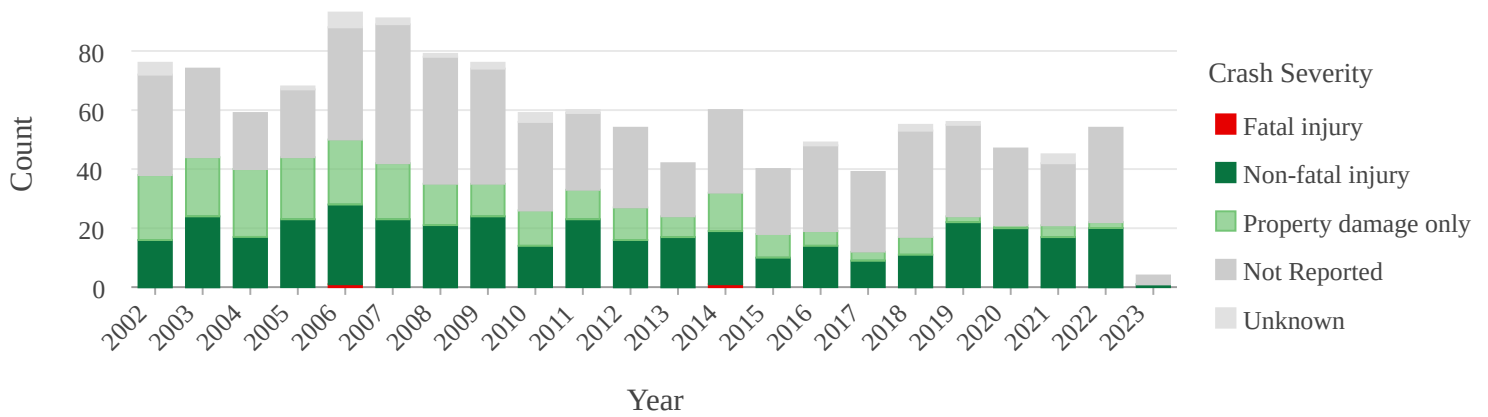


Figure 30. Crashes by year and severity. (MassDOT, 2023).

Notably, crashes that involved non-motorists were heavily concentrated at the two Grove Street intersections. This may be the result of the design of those intersections. Unlike the other intersections, there are no pedestrian signals on the Grove Street intersections. Other unprotected crosswalks on Elm Street and Holland Street were also common locations for crashes involving non-motorists.

Crashes by NonMotorist Type and Crash Severity

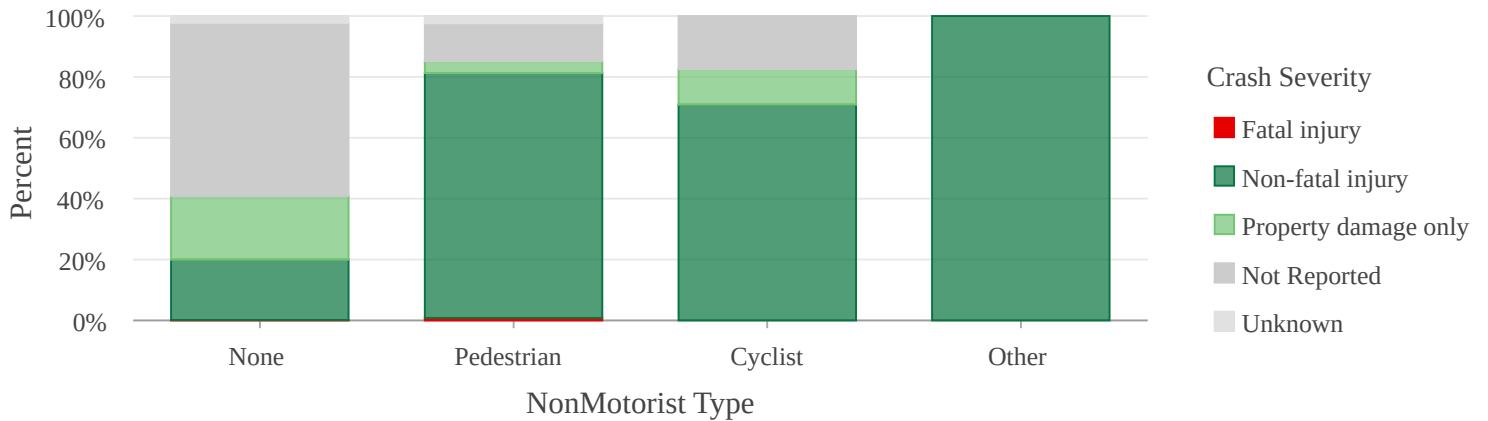
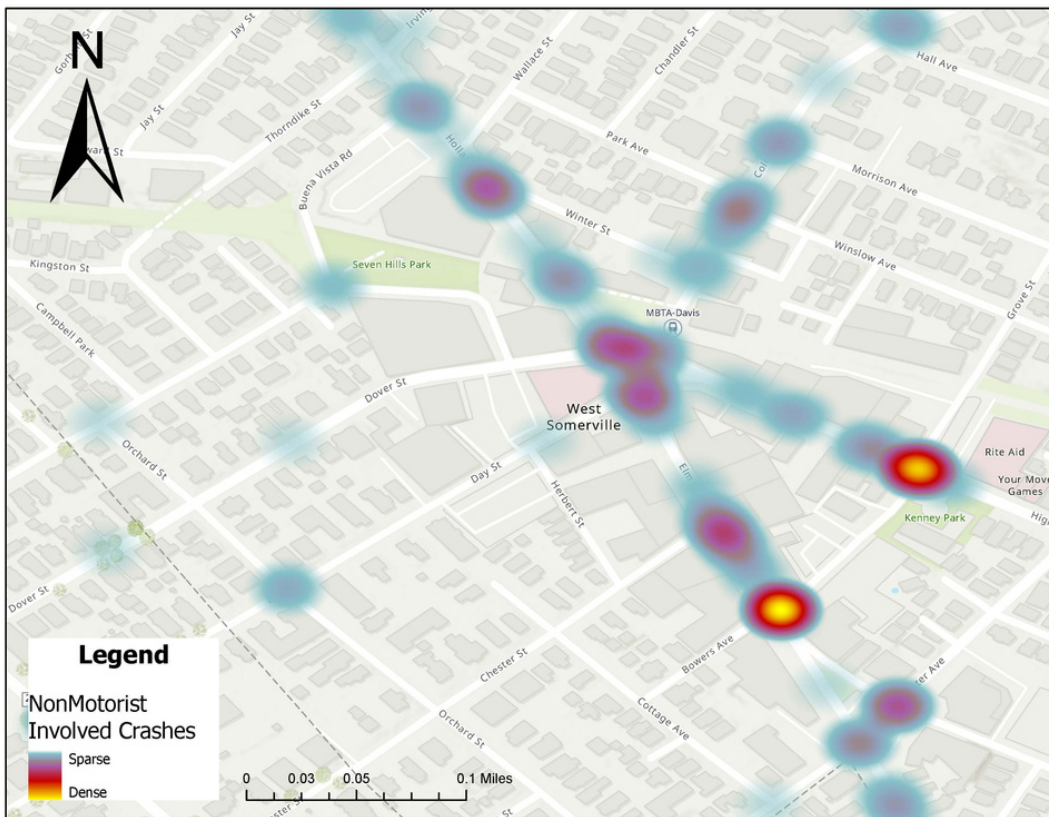
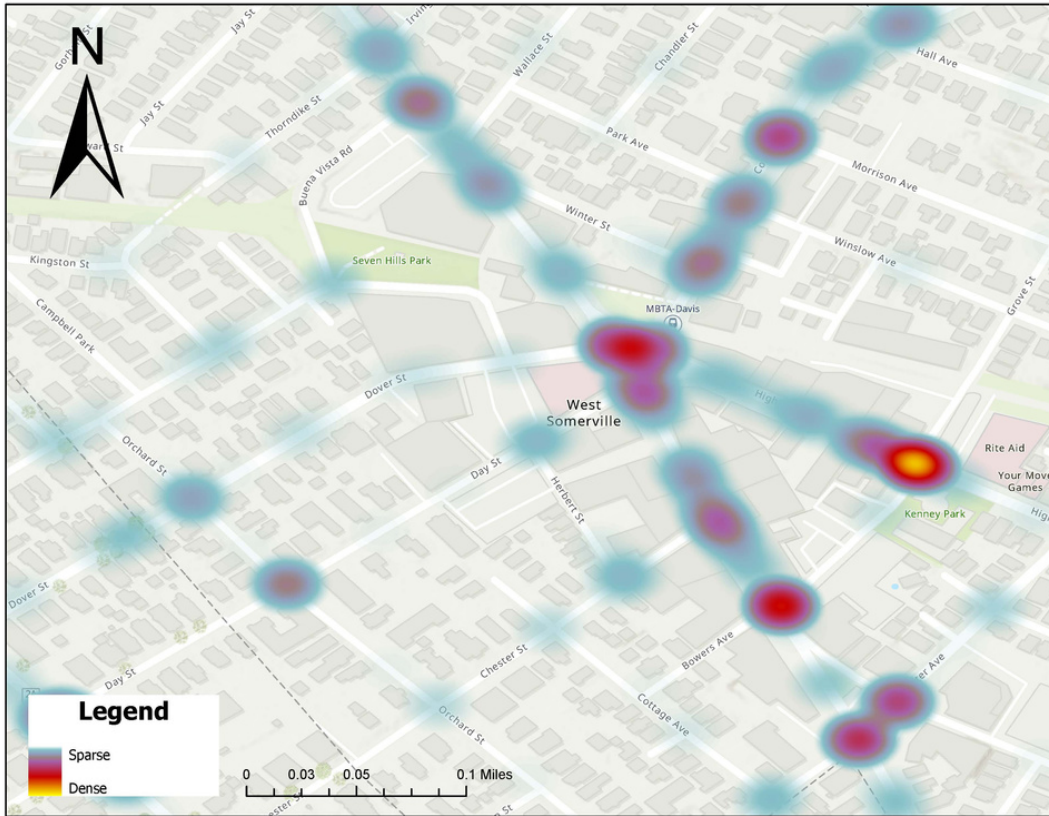


Figure 31. The percentage of crashes involving each non-motorist type that resulted in injury, showing that crashes involving cars only were 20% likely to result in injury versus an 80% likelihood for crashes involving pedestrians (MassDOT, 2023).



Figures 32 and 33. Crash locations, including all crashes (top) and non-motorist involved crashes (bottom) (MassDOT, 2023; map created by the project team).

Citations and Service Requests

Maps were also created using publicly available data from the City of Somerville. Densities of service requests, traffic enforcement, citations, and other violations highlight hotspots in Davis Square. The clustering of bike-related citations on Elm Street and between the segments of the Community Path indicates heavy bike traffic through these corridors. However, these sections of Davis Square lack dedicated bike lanes or natural bike paths, creating an environment where bike traffic contends with both pedestrians and cars for space on roads and crosswalks.

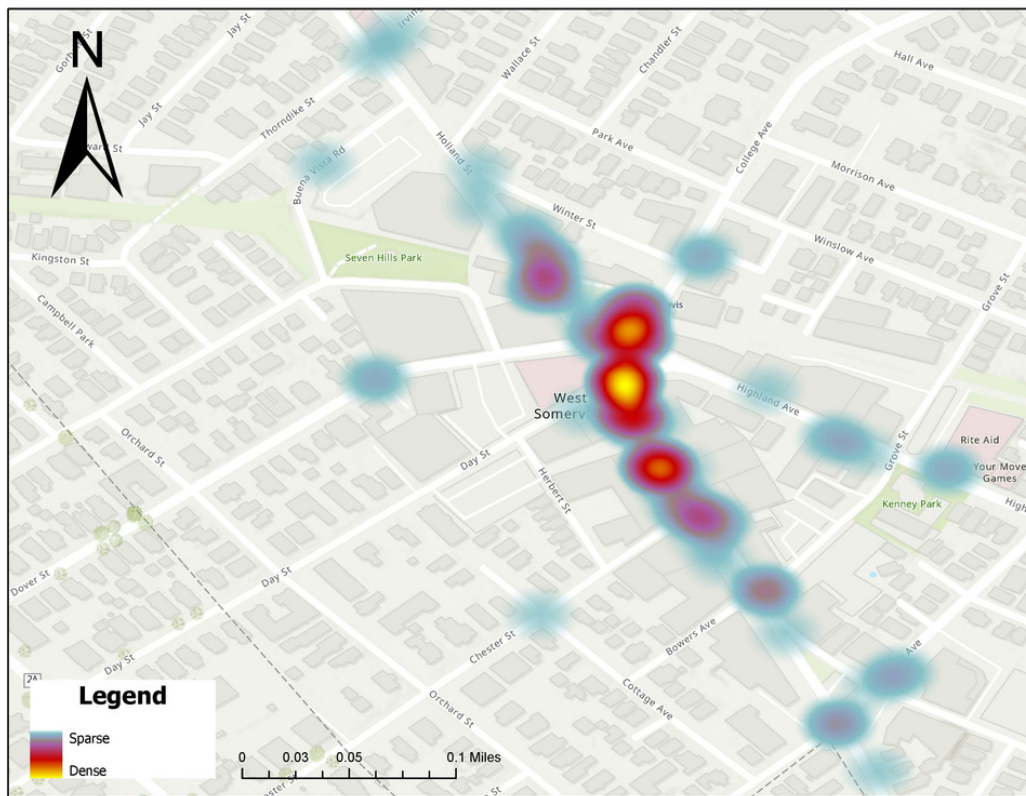
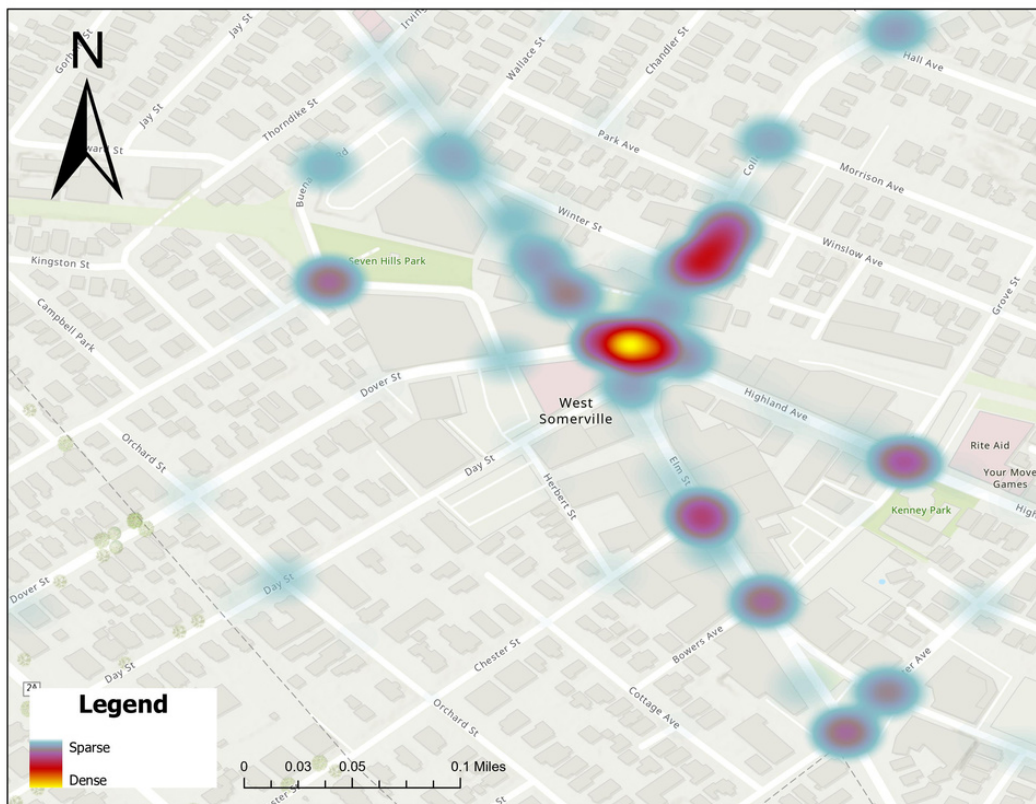
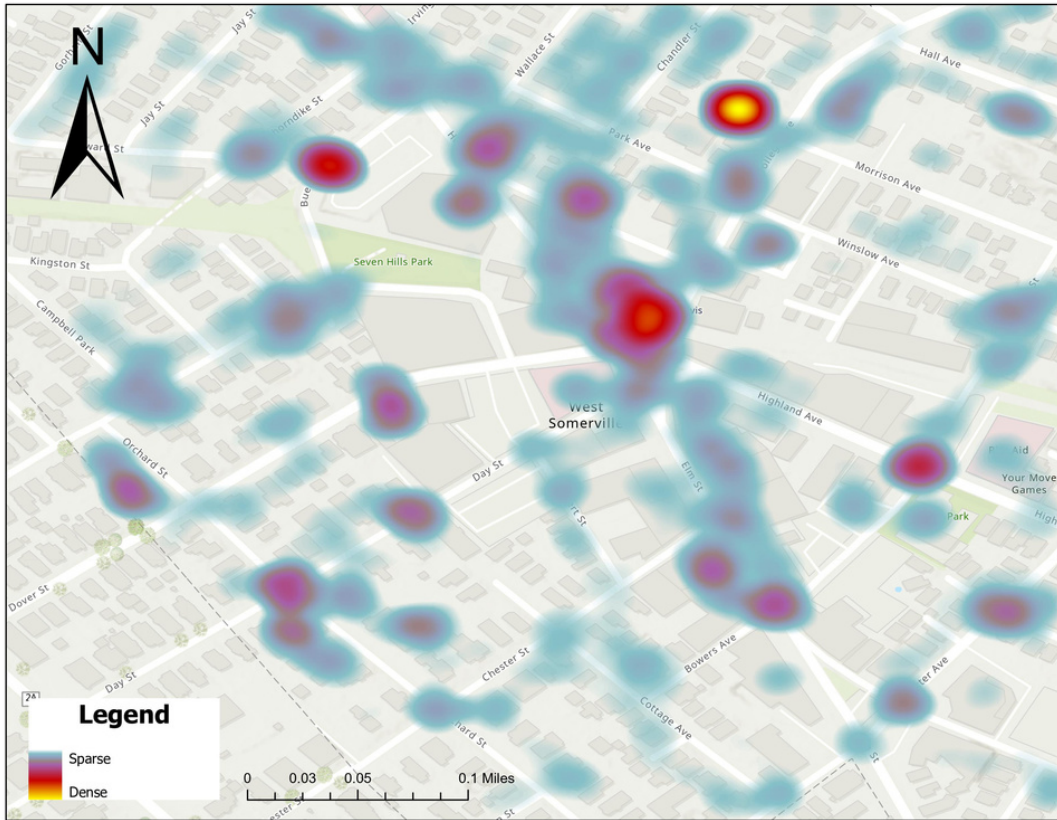


Figure 34. Density of bike enforcement incidents (Somerville, 2023; map created by the project team)

As the main through point, the central intersection is the location of high densities of citations and 311 service requests. 311 requests include concerns regarding public safety or infrastructure-related issues. The high density of incidents in this area correlates with our findings from the participatory mapping sessions in our focus groups. Participants had negative connotations associated with this intersection, with multiple people identifying it as unsafe and inconvenient.



Figures 35 & 36. Locations of 311 service requests (above) and traffic citations (below) in Davis Square (MassDOT, 2023; map created by the project team)

TURNING VEHICLES



TO

LEFT LANE
MUST
TURN LEFT




Interviews



A total of eight interviews were conducted, including business owners of Davis Square, City of Somerville officials, and residents that are part of local community groups such as DavisNow and Somerville Alliance for Safe Streets. All interviews included a baseline set of questions regarding the interviewee's opinions about Davis Square as well as questions specific to the interviewee's experience and knowledge base. Interviews lasted between 30 minutes to an hour in length. Interview descriptions have remained anonymous and have been coded to best describe common themes throughout the interview.



Business
Owners



Public
Officials



Community
Groups

Business Owners

Business Owner interviewees were owners and managers of businesses located directly within Davis Square. We interviewed three business owners.

One interviewee has been a prominent business owner in Davis Square for more than two decades and spoke of the changes Davis Square has gone through from the early 20th century to the present. Davis Square has gone from a "regular working-class neighborhood" to a present-day destination for nightlife, restaurants, and entertainment. This interviewee believes that pedestrianizing Elm Street would not impact their business, however closing off the street overall would impact all businesses along Elm Street. The interviewee also stated that any people drive to the businesses in Davis Square; car-oriented people would be able to find too few alternatives to making their way to businesses or finding offsite parking. This business owner believes that removing parking along Elm Street would have some impact on patronage and revenue along the street. Also noted, "Davis Square is in the worst state of repair" this interviewee has seen in their lifetime and is in a state of neglect. This interviewee wants the city to take action by expanding outreach and talking with more stakeholders in the area. An example of the city not responding to needs in Davis Square would be the removal of three-hour metered parking spaces in the Square without any input.

Business Owners

A second interviewee mentioned common themes such as living and conducting daily activities in Davis Square. This resident and business owner mentioned the inconvenience of driving through Davis Square as well as concerns for safety and accessibility issues for the disabled and elderly populations. This interviewee avoids dining and leisure activities in Davis Square and will opt to travel to other areas of Somerville instead. A focal issue in this interview was that small businesses are declining while mainstream chains enter Davis Square such as Chipotle and Starbucks. This interviewee noted an increase in overall rent for small businesses and concerns that the lack of daytime traffic means that businesses do not gain a lot of traction except for weekends. Outdoor space was noted to be a benefit of Davis Square, increasing functionality and leisure; the interviewee also enjoys HONK! Festival, stating that the festivals add value to Davis Square. This business owner stated that their business is located right off Davis Square because it was a great opportunity for the purchase of space in a convenient location.

The third business owner chose to conduct retail business in Davis Square because the demographics in the area fit with their targeted audience of people between the ages of 21 and 40 years old and those with disposable income. The interviewee thinks there is not enough change occurring in Davis Square. They said that change does not necessarily have either positive and negative associations but rather should meet the goal in development and plans for the area. They see Davis Square's sidewalks as a priority. Additionally, they feel that Somerville's roads are getting worse and are in need of more cleaning. Apart from these concerns, this business owner speaks positively about outdoor dining in Somerville. Particularly, they feel that the City's licensing commission has done a good job of creating a pathway towards long-term placement of outdoor dining as a component of businesses. As a business owner on Elm Street, they generally feel favorably towards a pedestrian mall from Mike's to B-Fresh with closures starting at 5pm on Friday and reopening 5pm on Sunday. They emphasize the key to this project would be Davis Square business owners understanding the plan and expecting better communication from the city on the process of designing a pedestrianized space.

Public Officials

Public officials include government employees and appointed or elected members of government, in this case of the City of Somerville. We interviewed two public officials: a city planner and a city councilor.

Our first public official is a current senior employee in the Somerville Mayor's Office of Strategic Planning and Community Development and is a member of an eight-person interdisciplinary team tasked with equity and mobility concerns. They mentioned the long history of community activism and organizing in Somerville since the late 1960s, and that a significant amount of policy reform in the city has been driven by community engagement and participation. This interviewee described the current streetscape of Davis Square as reflecting the values of the "mall era" of the mid-to-late 1980s: a large amount of parking, multiple-lane, one-way streets, and limited pedestrian accessibility. They broadly support a more accessible Davis Square, while recognizing the importance of retaining some parking and loading/unloading zones for people with mobility difficulties. They appreciate events such as HONK! Festival and ArtBeat for creating a cohesive community voice, while simultaneously acting as a natural form of pilot program that acclimates residents to a more pedestrianized Davis Square.

As a city employee and planner, this interviewee is very familiar with the politics of streetscape design and pedestrianization; often, such initiatives receive simultaneous strong pushback and support, which requires the city to find a middle ground or take incremental steps to achieving goals of increased accessibility. They noted that business opinions on pedestrianization are not homogenous, with some supporting and some opposing the idea. This interviewee reported that changes to streetscape design and accessibility, such as ADA-compliant wider sidewalks, are slowly and gradually occurring. This is due to the long review process: changes must be approved by traffic engineers, vetted with the community, and fully studied. Therefore, a rapid pedestrianization of Davis Square is not possible. However, these gradual planning processes may ultimately lead to a future pedestrianization of Elm Street, or the creation of a pilot program to periodically test it.

Public Officials

We also interviewed a City Councilor of Somerville, with more than 25 years of experience in construction, urban development, strategic planning, and project management. This interviewee recommended an organized business delivery management system in Davis Square as a way towards pedestrianization. Specifically, they mentioned regulating delivery times, especially for large commercial entities such as Starbucks, and using smaller trucks for deliveries. Both a limited delivery time window and the use of smaller delivery vehicles could be favorable factors in a pedestrian environment in reducing traffic congestion and improving safety. The interviewee suggested that a different mix of parking than what is current is a way to support Davis Square's realm of social and economic activity. They described the changing trends in Davis Square as shifting from a "mix of businesses" to an "entertainment destination."



Community Groups

Community groups were identified as Somerville Alliance for Safe Streets and DavisNow. We interviewed three members of these groups.

DavisNow is an organization of community members who support the repair, preservation, and thoughtful growth of Davis Square. We interviewed two members of DavisNow. One believes that 'Davis Square is the spiritual and cultural heart of Somerville.' This person is a resident living in Davis Square. This interviewee loves the accessibility of being close to the bars and restaurants and is also concerned about new developments in the Square. Using all forms of transportation, this interviewee states that Davis Square is "a goddamn nightmare for any mode of transit." However, it was noted that outdoor patios and all of the festivals give Davis Square life and make it an area not just meant for passing through. Lastly, this interviewee supports pedestrianization.

Another interviewee, also a member of DavisNow, questioned a lack of safety in Davis Square, especially with regards to the lack of maintenance of the sidewalks and bricks in the area. This interviewee believes that pedestrianizing Elm Street "breathes vitality into the stretch" and helps give Davis Square a stronger identity. This specific interviewee has worked with DavisNow to develop plans reconfiguring the Davis Square intersection to close off Elm Street. They stated that the only way to find out the ramifications of pedestrianizing Elm Street would be to test it out. This interviewee believes that outdoor dining is an eye opener for supporting ideas of pedestrianization which would also allow for the expansion of businesses. They said that the pedestrian experience needs improvement, and with Davis Square being a hub, safety must take over as a design goal. This interviewee left us with an ending note- "do not let the solution determine the outcome."

"Davis Square is the spiritual and cultural heart of Somerville."

— DavisNow member

Community Groups

We also interviewed a member of Somerville Alliance for Safe Streets, who noted that Davis Square is one of the hubs of their normal life, conducting a variety of activities there and using multiple transportation methods. This person likes the ‘human scale’ of Davis Square as well as the mom-and-pop businesses, but noted the lack of small shops and were concerned about the trend of business change, rising prices, and new developments. This interviewee dislikes the chaos of traffic and does not own a car. They also noted that the deterioration of the sidewalks

creates safety issues for pedestrians. Lastly, this interviewee loves outdoor patios and festivals and is in support of pedestrianization.



Figure 37: Business on Davis Square (above)



Figure 38: Businesses on Elm Street (above)



Figure 39: Businesses on Elm Street (above)

Focus Groups



We conducted four focus groups with community members who responded to our invitation. We asked questions that ranged from broad to narrow, starting with asking exploratory questions about participants' familiarity with Davis Square to more specific questions about the neighborhood's programming, amenities, and accessibility.

We provided maps of Davis Square and asked participants to do two things: draw their typical path through the Square and mark with sticky notes locations on the map they deemed “safe,” (blue), “convenient,” (yellow), “unsafe,” (pink), and “inconvenient” (orange) for access. Each focus group lasted about an hour in length. The participants' names remain anonymous and the discussions are summarized.

The four focus groups were as follows:

Virtual

- Session 1: Thursday, April 13, 2023 at 5:30PM EST
- Session 2: Thursday, April 13, 2023 at 7:00PM EST
- Session 3: Friday, April 14, 2023 at 5:30PM EST

In-Person

- Friday, April 15, 2023 at 10:00AM EST

In-person Focus Group

The in-person focus group was held from 10:00-11:00 AM on Saturday, April 15th . The session was attended by six participants. Four participants self-identified as male, two identified as female, and five identified as White. One participant indicated “none” for race/ethnicity. Two participants were between the ages of 40-59, three were aged 21-39, and one was aged 80+. Three participants reported their household incomes between \$50,000 and \$99,999, two reported incomes between \$100,000 and \$149,999, and one did not report their income.

Table 3. Demographic characteristics of in-person focus group participants

Demographic characteristics of in-person focus group participants				
Participant number	Age	Gender	Race or ethnicity	Income
1	40-59	Male	White	\$50,000-\$99,999
2	21-39	Male	White	\$50,000-\$99,999
3	40-59	Male	None	\$50,000-\$99,999
4	21-39	Male	White	\$100,000-\$149,999
5	21-39	Female	White	\$100,000-\$149,999
6	80+	Female	White	Unlisted

There was consensus amongst the younger participants aged 21 to 39 in favor of outdoor patio space. However, each brought a nuanced understanding of it. For example, Participant 4 shared that they would not enjoy patio space right next to traffic because of safety concerns, the general unpleasantness of traffic, and vehicle exhaust gases. Participant 5 shared a similar opinion of not feeling safe with outdoor patio space in a car environment, particularly aware of car crashes that happen in Davis Square already.

In-person Focus Group

The discussion led to an imagining of rebuilding Davis Square's streetscape. For example, Participant 2 was interested in understanding how Mike's acquired the slipway as their patio space and its potential expansion. Participant 1 was interested in reconstruction of the area with landscaping to help with stormwater drainage. Participant 2 agreed and thought a small community garden could be a nice addition to the environment. This conversation highlighted participants' interest in Davis Square becoming a car-free pedestrian zone with outdoor dining and expansion of public green space.

A common theme from the focus group centered on navigating Davis Square's traffic patterns. Participant 1 initiated the conversation by talking about their travel path through Davis Square. They pass through about once or twice a week and their mode of travel is typically on a bike. They find that the side streets are easier to bike on whereas the intersection or center of Davis Square is "just chaos" so they would need to get off their bike and walk around. Participant 5 found biking through Davis Square to be "irritating" and "not effective" when the Community Path does not connect. Participant 6 discussed their experience coming through Davis Square for over fifty years, shifting from walking and public transit pre-pandemic to now driving. They contended that the current traffic patterns make driving "very difficult." Participant 3 described the different modes of transportation that are accessible such as the T station, buses, and Blue Bikes, but also found that biking through the center of Davis Square can be "rough."



Park Ave

Hall Ave

Winslow Ave

Winslow Ave

Winslow Ave

just how???

no history

Rite Aid

Your Move Games

Kenney Park

Tenoch Me

Opá Greek Yeeros

Chester St

Chester St

Cutter Ave

West St

Bowers Ave

Cutter Ave

Hawthorne St

College Ave

Summer St

Whipple St

Liberty Ave

Liberty Rd

Clifton St

Highland Ave

Virtual Focus Groups

To account for varying availability, accessibility, and COVID-19 safety needs, we held three virtual focus group sessions using the Zoom platform. These sessions occurred from 5:30-6:30 PM and 7:00-8:00 PM on Thursday, April 13th and from 5:30-6:30 PM on Friday, April 14th. The two Thursday sessions were attended by five and four participants respectively and two participants attended the Friday session.

We conducted virtual sessions using the same structure as the in-person session. Upon entering the Zoom waiting room, we assigned a number to each participant in order to anonymize responses. We instructed participants to fill out a brief demographic survey specifying their age, income, gender, and race. We virtually posted the participatory mapping component using Google's Jamboard interactive whiteboard software.

Participants were provided with a link to the Jamboard file where they were able to draw their typical path through Davis Square on a map and mark locations on the map they deemed "safe" (blue), "convenient" (yellow), "unsafe" (pink), and "inconvenient" (orange) for access. Participants marked these locations by dragging pinpoint markers (circles) or annotatable "sticky note" tags onto a map of Davis Square.

Virtual Focus Groups

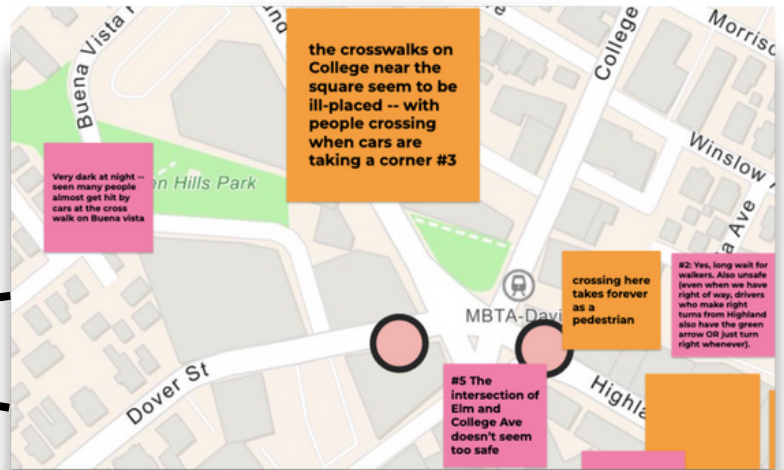
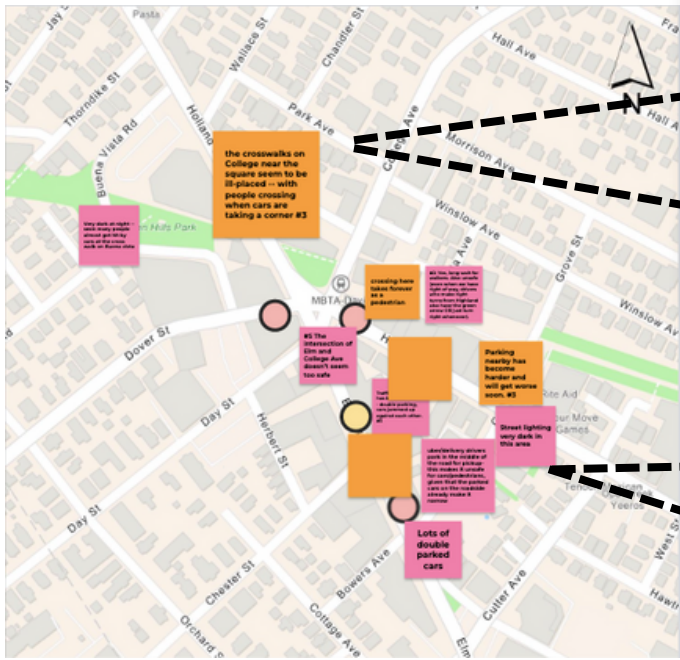
SESSION 1 (4/13 AT 5:30 PM)

Session 1 consisted of five participants with a mixture of long and shorter-term Davis Square residents. Two participants were between the ages of 18-39, two were aged 40-59, and one was aged 60-79. All participants self-identified as white, four identified as female, and one identified as male. One participant reported their household income as being under \$50,000, two reported incomes between \$50,000 and \$99,999, and one reported an income greater than \$150,000. One participant did not report their income.

All participants, regardless of whether they live in the Davis Square neighborhood, described enjoying the restaurants, bars, and other small businesses present in the area. There was also shared appreciation of the Square's public spaces, atmosphere of community, and liveliness among participants. Two people commented on the convenience and accessibility of services in the neighborhood, including dentists' offices, banks, doctors' visits, and access to transit. People also reported enjoying the temporary street closures that occur during cultural events in the Square. One long-term resident expressed concern about socioeconomic transformation in the neighborhood, specifically increased business homogeneity, displacement, and loss of the neighborhood's intangible character.

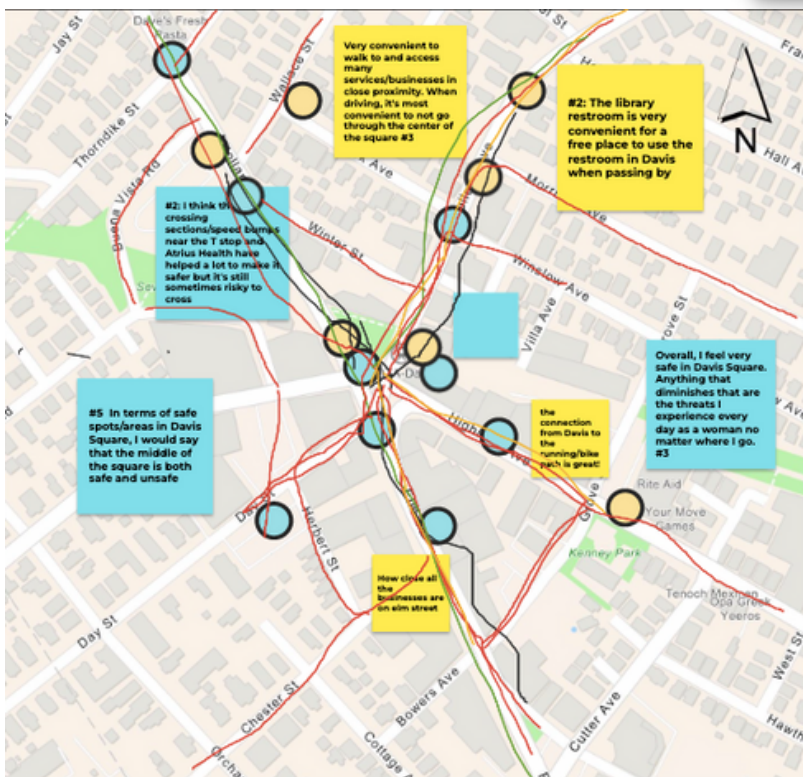
During the participatory mapping session, there was a much greater portion of locations marked "unsafe or inconvenient" than "safe or convenient." One participant appreciated the addition of speed bumps near the Atrius Building. People considered numerous locations in the vicinity of Davis Square to be "unsafe or inconvenient." The pedestrian crossing at Highland Avenue and College Avenue was universally characterized as dangerous because of the blind right turn from Highland to College conflicting with crossing pedestrian traffic when signal timing overlaps. The crossing at Dover Street and Elm Street was described as unsafe because of traffic illegally turning right-on-red and the high traffic volumes on Elm Street. All participants agreed that there is a lack of lighting at numerous points in the neighborhood (near the Rosebud Diner at Elm Street and Cutter Avenue, and Holland Street towards Teele Square) and a lack of public restrooms.

Figure 41. Participatory maps from virtual focus group session 1



Legend
(applies to both in-person and virtual focus groups)

■ = safe	■ = unsafe
■ = convenient	■ = inconvenient



Virtual Focus Groups

SESSION 2 (4/13 AT 7:00 PM)

Session 2 consisted of four participants with two long-term and two shorter-term Davis Square residents. Two participants were between the ages of 18-39, and two were aged 40-59. Three participants self-identified as white, and one identified as Asian. Two identified as female, and two identified as male. The four participants reported a range of household incomes, with one in each designated bracket (under \$50,000, \$50,000-\$99,999, \$100,000-\$149,999, and \$150,000+).

When responding to our exploration questions, participants who use a car described feeling fear or discomfort when driving through the center of Davis Square. This was shared by both long and short-term residents including those who are very familiar with traffic patterns, who expressed concern that newcomers or those unfamiliar with the area have difficulty navigating the intersection. One person who primarily bikes through Davis Square reported almost never driving through the intersection, describing it as a “terrifying experience.” Participants were broadly supportive of the outdoor dining infrastructure and public space in the neighborhood, and value the sense of community fostered by the Square. Lastly, several participants expressed concern regarding business deliveries; while deliveries are necessary to sustain the neighborhood’s small businesses, people noted that there is inadequate space for trucks to stop, the designated loading zones are frequently blocked, and stopped trucks contribute to traffic obstruction on Elm Street.

During the participatory mapping session, there was a much greater portion of locations marked “unsafe or inconvenient” than “safe or convenient.” Two participants declined to comment on what they deemed safe or convenient, one described the variety of bus connections as convenient, and another noted that very little about the Square is safe or convenient for pedestrians except for the segments of the Community Path on either side of Davis.

Virtual Focus Groups

SESSION 2 (4/13 AT 7:00 PM)

Participants characterized numerous locations in Davis as being “unsafe or inconvenient.” The crosswalk on College Avenue between the MBTA station and Davis Square Plaza was frequently cited as being both unsafe and inconvenient, due to the length of the light cycle and a tendency for pedestrians to jaywalk into oncoming traffic. Simultaneously, participants noted that the complexity of the current intersection in Davis Square leads to driver confusion and “creates an atmosphere where the typical rules of the road don’t seem to apply or make sense.” People who both drive and walk through the Square described how poor visibility, particularly when turning right onto College Avenue from Highland Avenue, coupled with the complex intersection design creates a dangerous environment for pedestrians and drivers alike. One participant, a newer resident of Davis Square, characterized navigating the intersection as a “terrifying experience” in any mode of transport, and commented on how difficult the area is to navigate for newcomers and college students. Participants also described the pedestrian crossings at Day and Dover Streets at Elm Street as being very unsafe, with one person noting that three pedestrians were killed there. Safety issues stem from large trucks turning at the intersection, in addition to the tendency for drivers to make illegal right-on-red turns when pedestrians are crossing.



Figure 41. Participatory map of travel path from virtual focus group session 2

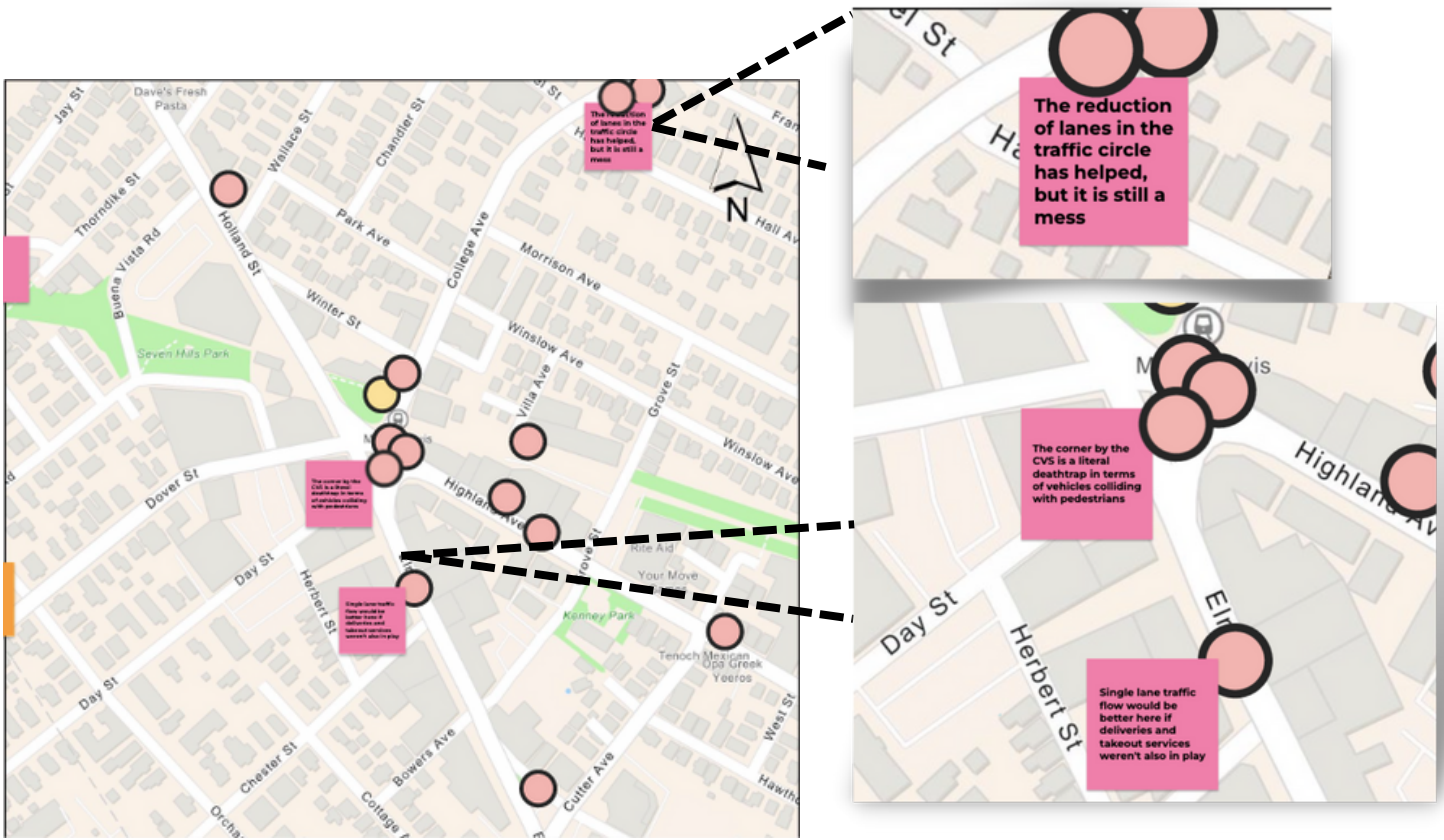
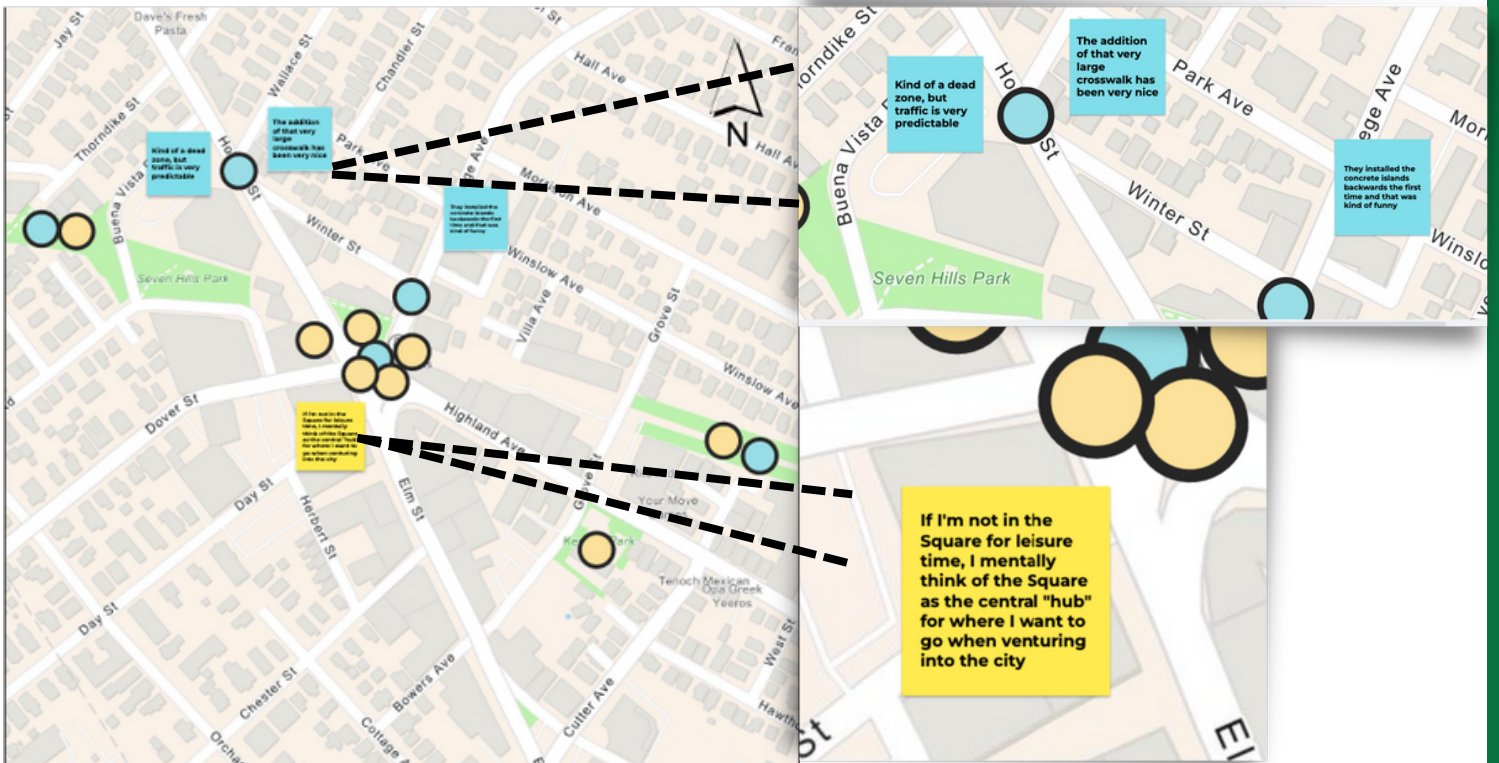


Figure 42. Participatory maps from virtual focus group session 2



Virtual Focus Groups

SESSION 3 (4/14 AT 5:30 PM)

Session 3 consisted of two participants with one long-term resident and one shorter-term resident. One participant was between the ages of 18-39, and one was aged 60-79. One participant self-identified as white, and one identified as Asian. One identified as female, and the other identified as male. The two participants reported household incomes between \$50,000-\$99,999 and greater than \$150,000.

Both participants described visiting Davis Square less frequently after the COVID-19 pandemic but enjoying the quantity of restaurants, bars, cultural activities, and outdoor space in the neighborhood. During the exploration questions, the age 60-79 female participant (Participant 1) described frustration with the parking allocation, as she is a senior who needs vehicle accessibility and is unable to ride a bike. As a driver, she also expressed frustration with the quality of roads, traffic pattern design, and the removal of two-way traffic on Highland Avenue and Elm Street. The 18-39-year-old male participant (Participant 2) moved to Davis Square in 2018 and struggles with isolation during the pandemic; therefore, he appreciates the liveliness of the neighborhood and activity in the center of the square. Participant 2 primarily walks and described difficulties with pedestrian safety and navigability of the streets. He used to bike frequently, but now bikes through the neighborhood less often because of the difficulty navigating the streets. Participant 2 was an acquaintance of Leah Zallman, a pedestrian who was struck and killed in 2020 by a turning vehicle at College Avenue and Kidder Street; because of Zallman's death, Participant 2 is now a supporter of pedestrianization in the Square.

Virtual Focus Groups

SESSION 3 (4/14 AT 5:30 PM)

During the participatory mapping session, Participant 1 characterized Seven Hills Park, College Avenue, Elm Street, and Holland Street as being safe for pedestrians and cyclists. Participant 2 noted that nowhere in the neighborhood is particularly safe. Both participants described the main intersection at the center of the square as unsafe, with too many intersecting modalities and distracted behavior from drivers and pedestrians. Regarding convenient and inconvenient areas, both described the wealth of services and businesses in the neighborhood as convenient and the slowness of the MBTA and design of the road network as inconvenient. Participant 2 also discussed perceived public safety issues in the neighborhood, including increased public consumption of drugs and alcohol.



Figure 43. Participatory map of travel path from virtual focus group session 3

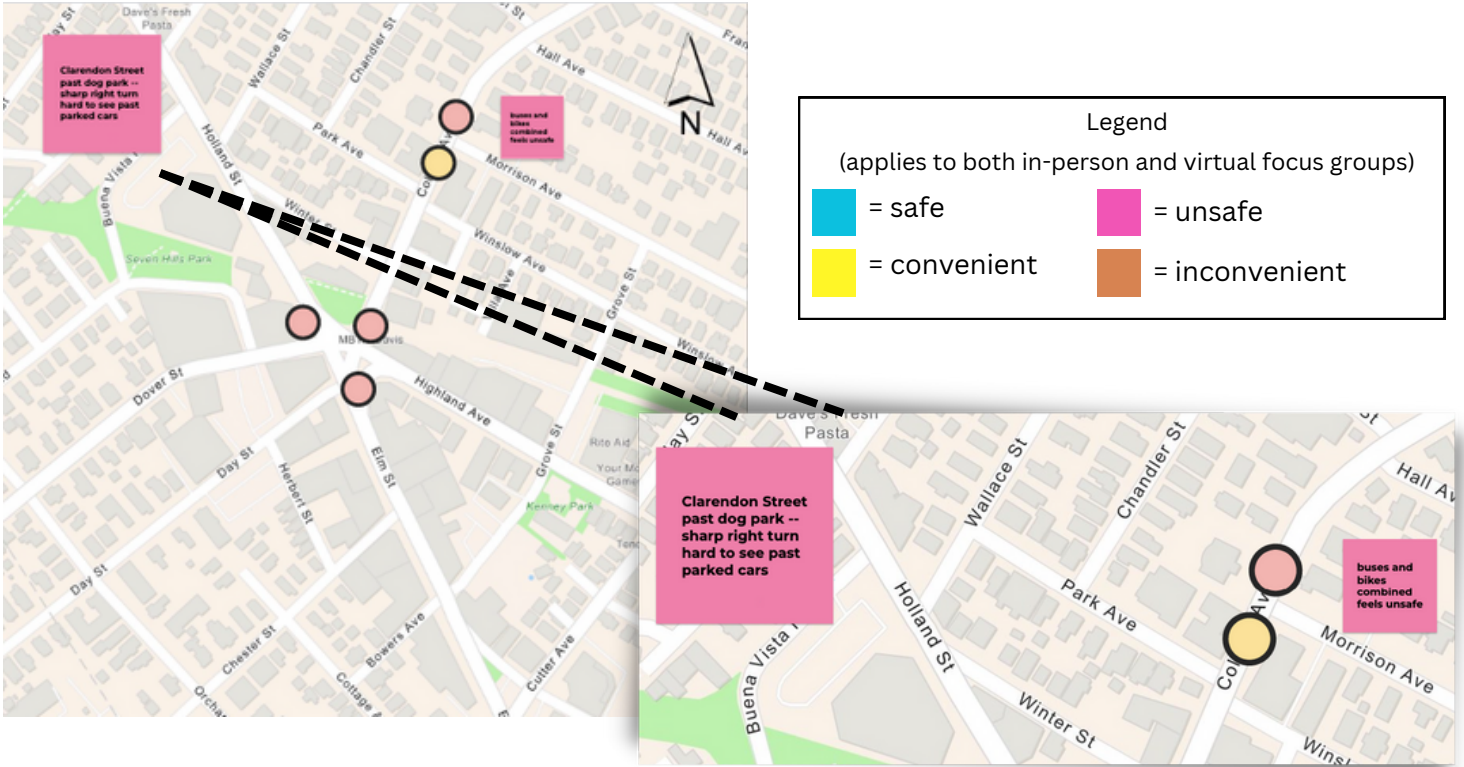


Figure 43. Participatory maps from virtual focus group session 3



Limitations & Conclusions

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Photo Credit: Wikipedia



Study Limitations

Although we attempted to distribute our survey to as broad of a group as possible, via public flyer postings and distribution in online communities relevant to Somerville and Davis Square, only approximately 25% of our responses came from people who pass through Davis Square without stopping. We suspect that this is because the majority of respondents found the survey while walking through Davis Square or other posted locations throughout Cambridge and Somerville. Furthermore, we did not post the survey to online communities located outside of Somerville (such as Arlington, Cambridge, Boston, or Medford groups) where pass-through traffic may originate.

Throughout the course of our research, we encountered several limitations regarding data collection, surveying, and outreach.

Many of these groups on Reddit or other online platforms restrict posts to focus directly on the communities they serve, limiting our ability to share the survey on those platforms. Additionally, despite translating the flyers into multiple languages and posting these flyers in neighborhoods where Portuguese, Spanish, Haitian Creole, and Cape Verdean Creole are spoken by a sizable portion of residents, the survey was not taken in any language other than English. Two Spanish-language surveys were opened but were not filled. This could signify that our outreach to underrepresented groups in Somerville was insufficient.

We also observed some self-selection bias regarding focus group registration, willingness to be interviewed, and survey responses. Focus group members consisted largely of individuals who have prior knowledge of Somerville city politics, are strongly opinionated on the topic of pedestrianization and accessibility or are local advocates. Therefore, our focus group sessions may not be wholly representative of the average Davis Square user or Somerville resident. We encountered a similar bias in terms of which individuals and businesses responded to our interview requests; members of various safe street and planning advocacy organizations are overrepresented in our interview responses. To a lesser extent, advocacy organization members are also somewhat overrepresented in our survey responses.

There were two areas where we encountered limitations regarding the data we used in our study. First, when conducting pass-through counts, most of our data collection occurred on Tuesdays and Thursdays, with fewer pass-through counts being conducted on Friday evenings and weekends. Our weekend data is largely statistically significant, with the exception of bus, cyclist, and pedestrian counts on weekend evenings at the Red Line collection point. All weekend data collection at the Elm Street and Chester Street intersection was statistically significant. Since we were unable to consistently and accurately collect our own parking data, we had to use parking counts provided by the city. The most recent parking study in Davis Square occurred in 2013, meaning that parking data obtained through this study may not be wholly current or fully representative of present-day conditions.



Conclusions

Our first research question concerned the existing conditions of Davis Square. We collected community members' opinions through a mixed-methods approach including surveys, focus groups, and interviews and developed a quantitative understanding of traffic patterns by analyzing our own observations and publicly available data. We found that the following opinions and trends were consistent throughout our study.



Conditions of Davis Square

Community members value the business landscape and lively atmosphere of Davis Square. People particularly appreciate and want to prioritize the local small businesses in the area. They are concerned about potential changes due to impending development projects and do not want to see the business landscape shift to favor chain stores and restaurants. Aspects of Davis Square that provide a sense of community and culture such as outdoor dining, public open spaces, and festivals such as HONK! and ArtBeat are extremely popular.

There is a large gap of opinion regarding biking and cars between younger and older people. The community members to whom we spoke generally fell into two groups – those who wanted to retain or improve existing car-based infrastructure such as parking capacity versus those who wanted to prioritize bike infrastructure and/or close streets to cars. Those groups were broadly split by age, with older people leaning more pro-car and younger people leaning more anti-car. The group in favor of car infrastructure emphasized the importance of accessibility and the need to park close by for medical appointments and critical errands.

Elm Street has high concentrations of both popular businesses and areas of concern for pedestrian safety. Many of the locations survey respondents, focus group participants, and interviewees identified as being places they liked about Davis Square were located Elm Street; the same was also true of many of the locations they identified as pain points. In our spatial analysis of crash and enforcement data, we found that Elm Street was a hotspot for incidents such as bike violations, parking violations, and crashes. The section of Elm Street between Grove Street and the main intersection of Davis Square stood out as an area of particular interest throughout the study compared to the parallel stretch of Highland Avenue nearby.

Many people coming to Davis Square did not drive there. We found that pedestrians outnumbered cars on weekends and weekday evenings at the Elm Street and Chester Street data collection point. We also know that most car traffic does not stop in Davis Square. According to analysis conducted by the City of Somerville, 75% of cars in the square drive through on their way to other locations. A 2013 parking study (also from the City of Somerville) found that there is spare capacity for parking even during peak demand, which is consistent with our own observations. This suggests that it is likely that most people in Davis Square during peak hours came by foot rather than by car.



Needs of Davis Square



The central intersection is functioning very poorly for pedestrians. Short crossing windows and instances where drivers have green lights to turn right across crosswalks while pedestrians have a simultaneous walk signal lead to confusion and a lack of safety and accessibility. This was evident in our own observations as well as in survey, focus group, and interview responses. It is also reflected in the prevalence of intersections (signaled and otherwise) as common locations for non-motorist involved crashes. Pedestrians often become frustrated by this intersection and jaywalk rather than wait for the light, leading to additional disruption in traffic flow and increased opportunities for potentially unsafe interactions between cars and pedestrians.

Community members are concerned about pedestrian safety and accessibility and see it as a priority. Survey respondents listed “pedestrian safety” as their top priority by far, with 72% of respondents listing it first and an additional 14% listing it second. This trend was also reflected in focus group and interview responses. Locations identified as problem areas in the survey open text responses and focus group participatory mapping exercises aligned strongly with crash hotspots from our spatial analysis. Cyclists particularly called out feeling unsafe navigating the square, and this is reflected in the data: 50% of crashes in Davis Square involved cyclists, while they made up an extremely small proportion of people in our pass-through observations.

The physical infrastructure of Davis Square is in disrepair. The poor condition of the bricks, streetlights, and signage in the square was noted by survey respondents as well as focus group participants and interviewees, though there was disagreement on what community members want to see instead. Some people advocate for replacing the brick pavers with concrete sidewalks, while others would prefer to repair the existing brick to make a smooth and safe walking surface. The unprotected crosswalks at intersections throughout the square were frequent locations for crashes involving non-motorists, and some respondents suggested adding signals or warning lights to those crosswalks.

The current system for delivery parking along Elm Street causes congestion. We observed a high number of instances of double-parking, especially during peak hours; this trend was also noted by survey respondents and focus group participants. In our review of the literature, we found that implementing a time window for deliveries or using smaller trucks could reduce traffic congestion and improve safety. We know that the City of Somerville is aware of these best practices from our conversations with city officials and from the Somerville Citywide Parking and Curb Use Report.

Impacts of Pedestrianization

Our second research question considered what could be the potential impacts of pedestrianizing Davis Square. Though we can assess the effects of pedestrianization once implemented in similar situations, we found that it is impossible to definitively predict the effects. Instead, the City of Somerville must consider the risks and possible benefits of pedestrianization and decide whether it is worth trying.



Pedestrianization can have significant benefits. As summarized in our literature review and case studies, adding street closures or traffic calming measures to an area improves walkability and safety for pedestrians and cyclists. Many, though not all, areas experience economic benefits from increased retail sales and increased land values as well, though there are some concerns regarding adverse logistical impacts on businesses and increased rents and home prices. Different methods of pedestrianization are appropriate in different circumstances and can have different impacts.

Pedestrianization is controversial among community members, with business owners having particular concerns. A significant group of our survey respondents mentioned pedestrianization as something they would like to see happen in Davis Square. This group tended to be less in favor of cars generally. Since opinions on car infrastructure are split, it stands to reason that people who are in favor of cars are less likely to support pedestrianization. From the literature, we know that business owners tend to have concerns that pedestrianization will negatively impact their sales. The business owners we talked to in Davis Square were not in favor of their streets being closed, as they worried this might obstruct deliveries and customer access, but they supported the idea generally. From our review of case studies, we know that successful pedestrianization efforts depend on strong engagement and communication between the city and the business community. The importance of communication was also emphasized in our conversations with local business owners.

Davis Square is a strong candidate for pedestrianization. From our literature review, we know that pedestrianization is most successful in areas that already have a high concentration of businesses, that are accessible by transit, and where people are already used to walking. We have observed that at certain times of the week, there are more pedestrians passing through Elm Street than there are motor vehicles. Davis Square has a Red Line stop and is a destination for shopping and recreation, as summarized in our survey results. The case studies we reviewed, particularly the one for New York City, made it clear that the presence of active community groups and volunteers is important for successful pedestrianization. Davis Square has that in SASS and DavisNow.

Recommendations



100

Recommendations

The following recommendations are drawn from our research. We have identified three elements of the Davis Square streetscape in need of improvement. Within each element, we have provided actionable steps that can be taken to address current needs and deficits in Davis Square.

1

Increase pedestrian accessibility by maintaining and improving physical infrastructure in Davis Square.

Sidewalks. Upgrade sidewalks so that their width and surfacing comply with Americans with Disabilities Act (ADA) standards. While ADA compliance requires sidewalks to be at least three feet wide, sidewalks under five feet wide must have passing spaces of at least 60” x 60” every 200 feet. The texture of sidewalks must be “firm, stable, and slip-resistant,” and free of loose or protruding concrete slabs or bricks (Federal Highway Administration & Boodlal, 2003). We suggest that the city conduct repair and maintenance of current sidewalk surfaces to ensure that they are level and free of obstructions or trip hazards.

Curb ramps. Widen and lower sidewalk curb ramps. There are locations, especially along Elm Street and Highland Avenue, where curb ramps at crosswalks are built along a steep grade or are very narrow. This presents difficulty for wheelchair users, people with mobility difficulties, strollers, pushcarts, and others. Widening and modernizing curb ramps would improve pedestrian accessibility.

Crosswalks. Repaint crosswalks and improve visibility of existing crosswalks with speed humps or other traffic-calming devices. While the city has started repairing these deficits, several crosswalks, such as those at Elm Street and Chester Street, Grove Street, and other locations, still exhibit degraded paint and paving conditions. This may make it more difficult for drivers to see the locations of crosswalks at night or during adverse weather conditions. Reconstructing more crosswalks as raised/speed hump crosswalks may aid in calming traffic flow and reducing speeds along streets with high pedestrian traffic. Furthermore, raised crosswalks could be used to reduce the grade of curb ramps and provide a wider space for pedestrians to enter the sidewalk.

2

Foster safe and efficient traffic flow for pedestrians, cyclists, and motor vehicles.

Signals. Reprogram and retime vehicle and pedestrian signals throughout Davis Square to reduce vehicle and pedestrian conflicts. The current signal pattern and timing of pedestrian and vehicle crossings may be misaligned as a result of aging traffic control systems and design limitations. At the College Avenue crosswalk parallel to Highland Avenue, traffic turning from Highland on to College must negotiate a blind right turn while pedestrians have the simultaneous right to cross. Other conflicts between pedestrian and vehicle rights-of-way are present at the Day Street and Elm Street intersection. Retiming the signals so that crossing pedestrians and vehicles are not in conflict would reduce pedestrian/vehicle incidents. Adding a red left arrow signal at the Highland Avenue and Day Street turn may improve traffic flow and pedestrian safety.

Deliveries. Increase loading/unloading spaces and develop a delivery schedule in coordination with local businesses and suppliers to reduce idling and double-

parking. Frequent double parking on Elm Street may occur because of a lack of adequate loading/unloading spaces and short-term parking. Expanding the number of short-term loading/unloading spaces on Elm Street would allow businesses to receive deliveries and vehicle passengers to be picked up or dropped off without negatively impacting traffic flow. Furthermore, developing a schedule for deliveries in conjunction with local businesses and their suppliers could stagger delivery times and reduce the amount of commercial loading/unloading in the area.

Bike lanes. Construct and connect protected bike lanes to bridge the gap in the

Somerville Community Path. The Community Path discontinuity between College Avenue and Elm/Holland Street is a frequent source of pedestrian/cyclist conflicts in the Davis Square Plaza. Constructing protected bike lanes on Highland Avenue and westbound Elm Street could help temporarily bridge the discontinuity until a more appropriate long-term solution is implemented.

3

Develop and implement a pilot program for temporary weekend closures of Elm Street to motor vehicle traffic.

Weekend closures. We suggest implementing temporary closures of Elm Street during weekends, when there is already a larger proportion of pedestrian traffic. Weekends are a time when implementing temporary street closures would be least disruptive to commercial and commuter needs. The high rates of foot traffic observed on weekends demonstrate that pedestrian traffic already comprises a significant portion of pass-through traffic on Elm Street.

Precedents. Adapt the preexisting protocols for closing Elm Street to motor vehicle traffic for events such as the HONK! Festival and ArtBeat for the pilot program. Implementing a temporary street closure pilot program could use similar frameworks developed by the city when closing portions of Elm Street for cultural events. Events involving street closures were frequently cited as a much-appreciated element of Davis Square culture in our surveys and focus group sessions, suggesting that Somerville residents may have some familiarity with and appreciation for a closed Elm Street.

Phasing. Begin a gradual process of acclimating Somerville residents to a pedestrianized Elm Street. Our review of case examples highlighted that pedestrianization initiatives are more likely to succeed if they are implemented gradually and incrementally. Launching a weekend pilot program would acclimate residents to a pedestrianized Elm Street at a time that is minimally disruptive for commuting or attending appointments. This would also ease small business owners into managing the implications of a pedestrianized street and allow businesses to gradually develop familiarity with a changing streetscape.

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Appendix



Appendix A: Interview Guide

Below is a list of interview questions pertaining to different groups relevant to our research. We have assigned generic categorical names for each group.

Questions for city officials, city department staff, and councilors:

- What does Somerville see as the priorities for Davis Square?
- Is the city currently considering any plans or policy concerning streetscape redesign/overhaul in Davis Square?
- What have you heard from residents regarding the current design and use of Davis Square?
- What have you heard from your constituents with limited mobility about Davis Square?
- How do you believe the design could be overhauled to be more inclusive of these people?
- The city of Cambridge temporarily closes portions of Memorial Drive to vehicles on weekends, and HONK Fest results in annual closures of streets around Davis Square. As a city official, do you think a similar weekend/Sunday closure program would be feasible for Elm Street?
- Have any plans for weekend/Sunday pedestrianization been considered?
- Since working as a Somerville city official, how has the number of bike and vehicle related casualties and injuries increased or decreased in Davis Square?
- Have city departments noticed a certain trend?

Questions for community members :

- How often do you come to Davis?
- What do you typically do there?
- What do you like about Davis Square?
- Are there any things that are difficult about Davis or that you'd like to see changed?
- How long have you lived in this area?
- What changes have you seen during that time (good/bad)?

- What do you see as the priorities for Davis?
- For the area generally?
- How do you get around, what transportation do you use?
- Does it vary?
- How do you make that decision?
- What factors might encourage you to walk vs drive vs take the T?
- During COVID, many businesses have implemented outdoor patio spaces. What do you think about this?
- Have you ever attended HONK! or another festival in Davis? What was that experience like?

Questions for businesses:

- What do you/your business see as the priorities for Davis Square?
- How many deliveries do you receive in a typical week?
- When your business receives deliveries, where does the vehicle typically park for loading and unloading?
- How would you feel about weekend or Sunday closures of Elm Street to motor vehicle traffic?
- What methods of transportation do your patrons tend to use to access your business (i.e. personal vehicle, walking, cycling, public transportation)?
- Do you believe that the removal of parking along Elm Street would impact your business' revenue or patronage?

Appendix B: Survey Guide

Survey Outreach

Flyers with a QR code to the survey were posted in Davis Square and other areas of Somerville including but not limited to: Porter Square, Magoun Square, and Union Square.

Internet communities where we posted survey links to:

Group	Platform	Member Count
r/somerville	Reddit	21,000
Somerville, MA	Facebook	14,000
Davis Square	Facebook	8,000
Somerville Alliance for Safe Streets	Facebook	190
Tufts UEP GroupMe	GroupMe	100
Somerville Nextdoor	Nextdoor	-
DavisNow!	Email List	-

Survey Questions

We are a team of Masters students in the Tufts Urban and Environmental Planning department conducting a study on Davis Square. All survey responses will be kept anonymous and the results will be presented only as summaries. All questions are optional. Thank you very much for your help!

You are being asked to volunteer in a research study. Please find information about this research for you to carefully consider when deciding about whether or not to participate here: <https://docs.google.com/document/d/e/2PACX-1vS86MY2qrQsKzzuk9a8pCwk4TdE57yNz2t6vQ8PktIJzf2uxD66R9ayLdPyJ5S3EjpfXT0l9yruoe3d/pub>. Please ask questions about any of the information you do not understand before you decide whether to participate.

Q1 What is your age?

- Younger than 20 (1)
- 20-39 (2)
- 40-59 (3)
- 60-79 (4)
- 80+ (5)

Q2 What gender do you identify with? Please check all that apply.

- Male (1)
- Female (2)
- Non-binary (3)
- Other (4)

Q3 What race and/or ethnicity do you identify with? Please check all that apply.

- White (4)
- Black or African American (5)
- Asian (6)
- American Indian (7)
- Native Hawaiian or Other Pacific Islander (8)
- Hispanic/Latino (9)
- Other (10)

Q4 What is your income?

- Under \$50,000 (1)
- \$50,000-\$99,999 (2)
- \$100,000-\$149,999 (3)
- \$150,000+ (4)

Q5 What most accurately describes how you interact with Davis Square? (check all that apply)

- I live here (1)
- I work here (2)
- I come here for errands (going to the grocery store, etc.) (3)
- I come here for recreation (going out to eat, going to the movies/shows, etc.) (4)
- I pass through but don't stop (5)
- I used to live here (6)
- Other (7)

Q6 What transportation do you normally use to/through Davis? (check all that apply)

- Walking (1)
- Biking (2)
- Red Line (3)
- Bus (4)
- Personal Vehicle (5)
- Ride-share (6)
- Other (7)

Q7 Please rank your priorities for Davis Square from highest to lowest:

- _____ Pedestrian convenience and safety (1)
- _____ Dedicated bike/bus lanes (2)
- _____ Smooth traffic flow (3)
- _____ Easy access to parking (4)
- _____ Outdoor space for recreation/events (5)
- _____ Outdoor space for businesses (6)

Q8 How do you feel each of these aspects of Davis Square are functioning currently:

- Pedestrian convenience and safety
- Traffic and parking
- Outdoor gathering space
- Commercial and business space

Q8 What aspect of Davis Square do you enjoy the most? (open response)**Q9 What would you like to see changed about Davis Square? (open response)***Survey Results*

Ethnicity and/or Race of Survey Respondents

#	Field	Choice Count
4	White	86.93% 552
5	Black or African American	0.94% 6
6	Asian	6.46% 41
7	American Indian and Alaskan Native	0.31% 2
8	Native Hawaiian or Other Pacific Islander	0.31% 2
9	Hispanic/Latino	3.15% 20
10	Other	1.89% 12
		635

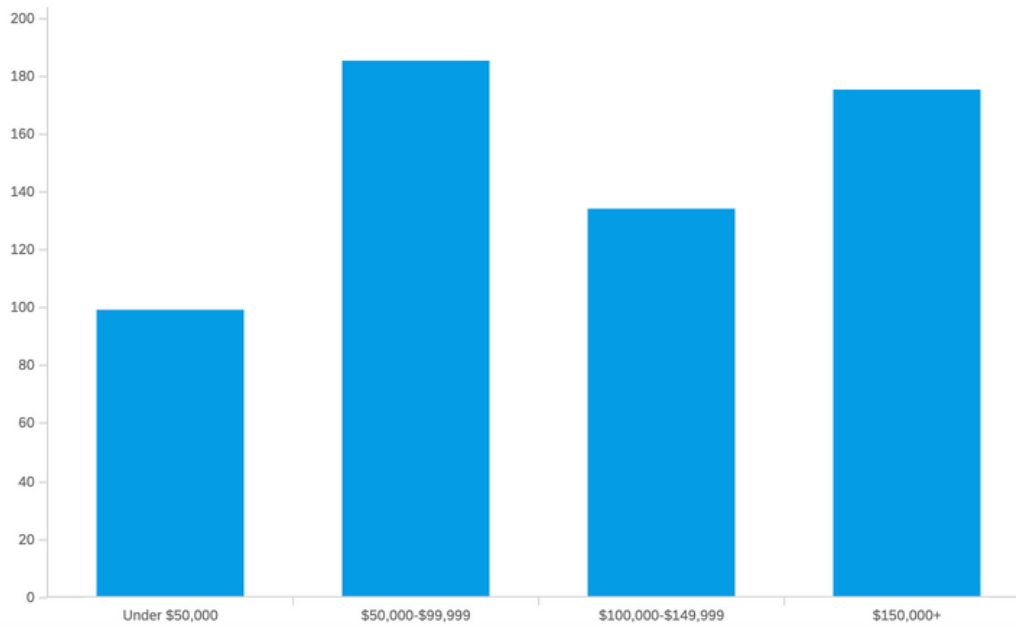
Gender of Survey Respondents

1	Male	45.60% 285
2	Female	49.28% 308
3	Non-binary	4.48% 28
4	Other	0.64% 4

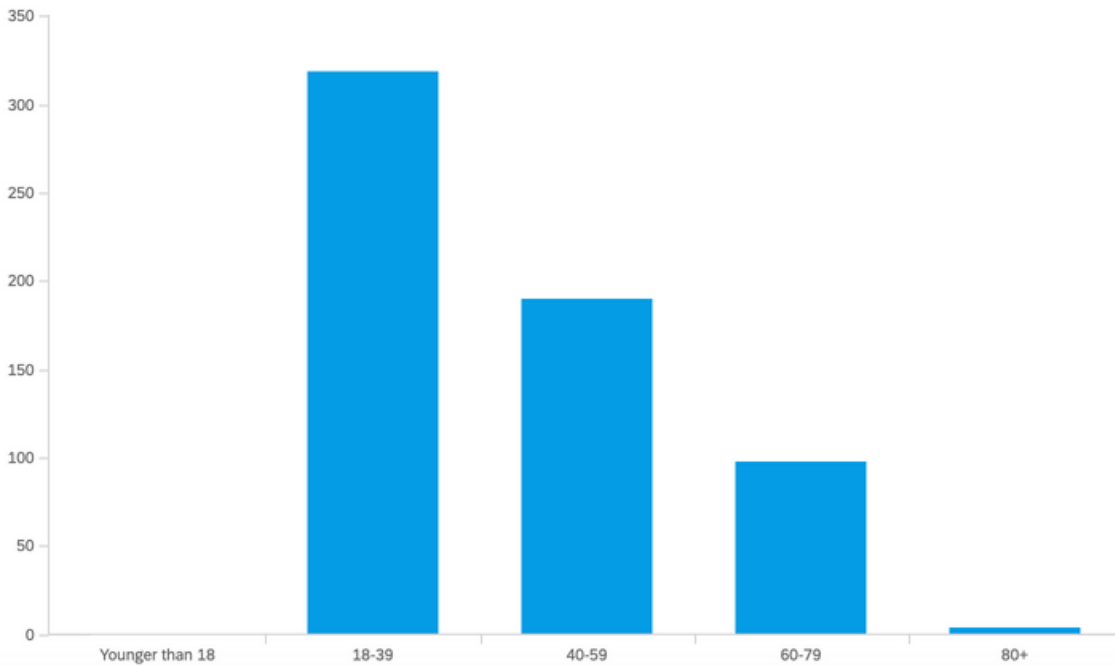
625

Income Levels of Survey Respondents

Income Levels



Age of Survey Respondents



Ratings of Aspects of Davis Square

#	Field	Very Poorly		Poorly		Acceptable		Well		Very Well		No Opinion	
1	Pedestrian convenience and safety	8.70%	53	30.71%	187	37.60%	229	16.75%	102	5.91%	36	0.33%	2
2	Traffic and parking	12.30%	75	40.16%	245	30.82%	188	5.41%	33	2.62%	16	8.69%	53
3	Outdoor gathering space	3.13%	19	31.91%	194	40.46%	246	17.43%	106	5.26%	32	1.81%	11
4	Commercial and business space	1.82%	11	12.71%	77	43.23%	262	29.21%	177	10.07%	61	2.97%	18

Priorities for Davis Square Rankings

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pedestrian convenience and safety	1.00	6.00	1.49	0.93	0.86	596
2	Dedicated bike/bus lanes	1.00	6.00	3.57	1.60	2.55	596
3	Smooth traffic flow	1.00	6.00	4.08	1.45	2.12	596
4	Easy access to parking	1.00	6.00	4.89	1.46	2.14	596
5	Outdoor space for recreation/events	1.00	6.00	3.25	1.31	1.72	596
6	Outdoor space for businesses	1.00	6.00	3.73	1.30	1.69	596

Appendix C: Focus Group Guide

Logistics

- Total time: 1 hour session for both virtual and in-person focus groups
- Participatory mapping will be done on a 44 in by 33 in size poster map for the in-person focus group and on Google JamBoard for the virtual focus group
- For each session, the project team will lead as two moderators, with each switching roles as tech assistant, and one notetaker

Timeline

1. Settling-in (3 min)
2. Assign each participant a number for anonymous identification in report
3. Administer short demographics survey
4. Introduction & Ground Rules (5 min)
5. Part 1: Questions
6. Introductory question (3 min)
7. Exploration questions (15 min)
8. Part 2: Participatory Mapping
9. Think about locations and travel path (2 min)
10. Mark on map (10 min)
11. Reflect as a group (20 min)
12. Exit question (2 min)

Ground Rules

1. We want you to do the talking. We would like everyone to participate.
2. There are no right or wrong answers. Every person's experiences and opinions are important.
3. What is said in this room stays here.
4. Please limit comments to under 2 minutes.
5. We will be recording this session. We want to capture everything you have to say. We will not identify anyone by name in our report. You will remain anonymous, unless you specify you want to be identified.

Focus Group Agenda and Questions

INTRODUCTORY QUESTION

1. What is your favorite thing (activity, event, etc.) to do in Davis Square?
(keep short)

EXPLORATION QUESTIONS

1. How often do you come to Davis? What do you typically do there?
2. How long have you lived in this area? What changes have you seen during that time (good/bad)?
3. How do you get around, what transportation do you use? Does it vary? How do you make that decision? What factors might encourage you to walk vs drive vs take the T?
4. Opinions on outdoor dining spaces?
5. What is your experience as a driver, pedestrian, or cyclist in the square?

PARTICIPATORY MAPPING

Think about locations and travel path

- Display map of Davis Square
- First, ask participants to think about their travel path.
- Then, ask them to think about the following questions:
 1. What are some locations that are/aren't safe as a pedestrian (point+comment)
 2. Where is/isn't convenient as a pedestrian? (point+comment)

Mark on map

- For the first question, participants use a marker to draw their travel paths in Davis Square in the form of a line
- After they are done with the travel path activity, participants will use stickers to mark locations where they feel are safe and/or convenient.
- A blue sticker indicates safe. A yellow sticker indicates convenient.
- Participants may use corresponding colors on sticky notes to place a comment on the map if they choose to do so.
- After the positive set of location questions, participants will use stickers to mark locations where they feel aren't safe and/or convenient.
- A pink sticker indicates unsafe. An orange sticker indicates inconvenient.
- Participants may use corresponding colors on sticky notes to place a comment on the map if they choose to do so.

Reflect as a group

- Ask participants to explain what they marked on the map. This reflection is an open-discussion amongst all session group members.

Appendix D: Fieldwork Data

Pass-through Tables

Weekday Morning, B Fresh
Total Counts (Sample Size): 5

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	239	47.8	53	17.4	47.8 ± 15.3	67	23
Bicyclists	47	9.4	3	10.2	9.4 ± 9.0	22	1
Cars	561	112.2	108	23.0	112.2 ± 20.2	144	82
Crossings	83	16.6	16	6.9	16.6 ± 6.06	24	8
Buses	23	4.6	4	1.9	4.6 ± 1.7	7	2
Commercial	45	9	10	3.3	9 ± 2.9	13	4
Sit/Stay	8	1.6	1	2.5	1.6 ± 2.2	6	0

Weekday Midday at B Fresh Crosswalk
Total Counts: 7

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	606	86.6	70	45.6	86.6 ± 33.7	172	42
Bicyclists	38	5.4	5	2.0	5.4 ± 1.5	8	3
Cars	943	134.7	141	18.8	134.7 ± 14.0	160	110
Crossings	238	34	33	16.8	34 ± 12.5	55	14
Buses	28	4	3	2.2	4 ± 1.7	8	2
Commercial	62	8.9	8	5.9	8.9 ± 4.4	20	0
Sit/Stay	13	1.9	1	1.2	1.9 ± 0.9	4	1

Weekday Evening, B Fresh
Total Counts: 7

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	1300	185.7	184	70.1	185.7 ± 51.9	312	110
Bicyclists	56	8	7	5.2	8 ± 3.8	17	1
Cars	976	139.4	134	30.5	139.4 ± 22.6	178	105
Crossings	459	65.6	74	21.2	65.6 ± 15.7	93	34
Buses	24	3.4	3	2.3	3.4 ± 1.7	8	1
Commercial	24	3.4	4	2.5	3.4 ± 1.9	8	0
Sit/Stay	14	2	0	3.1	2 ± 2.3	8	0

**Weekday Morning, Red Line
Total Counts (Sample Size): 6**

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	207	34.5	44	25.4	34.5 ± 20.3	75	6
Bicyclists	64	10.7	15	7.9	10.7 ± 6.4	21	1
Cars	790	131.7	154	41.9	131.7 ± 33.5	172	59
Crossings	361	60.2	54.5	35.5	60.2 ± 28.4	127	22
Buses	35	5.8	5	3.2	5.8 ± 2.6	12	3
Commercial	42	7	9	6.3	7 ± 5.01	17	1
Sit/Stay	9	1.5	2	1.4	1.5 ± 1.1	3	0

**Weekday Midday, Red Line
Total Counts: 7**

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	261	37.3	31	23.1	37.3 ± 17.1	74	14
Bicyclists	40	5.7	6	0.8	5.7 ± 0.6	7	5
Cars	862	123.1	119	13.6	123.1 ± 10.1	147	110
Crossings	329	47	43	16.2	47 ± 12	80	32
Buses	41	5.9	6	2.1	5.9 ± 1.6	9	3
Commercial	41	5.9	5	4.0	5.9 ± 3.0	10	0
Sit/Stay	17	2.4	3	2.1	2.4 ± 1.5	6	0

**Weekday Evening (Rush Hour), Red Line
Total Counts: 7**

	Total	Mean	Median	Std. Dev.	Margin of Error (95%)	Hghst.	Lwst.
Pedestrian	382	54.6	47	15.2	54.6 ± 11.3	79	41
Bicyclists	64	9.1	8	7.8	9.1 ± 5.8	21	0
Cars	1173	167.6	175	30.7	167.6 ± 22.7	197	107
Crossings	381	54.4	59	27.3	54.4 ± 20.2	96	19
Buses	39	5.6	6	1.6	5.6 ± 1.2	7	3
Commercial	24	3.4	3	2.6	3.4 ± 2.0	7	0
Sit/Stay	32	4.6	3	4.4	4.6 ± 3.2	12	0

Traffic Violations Tables

**College/Highland Intersection and Red Line Crosswalk
Total Counts: 11**

Violation Type	Count and Vehicle Type if Applicable
Running Red Light at Crosswalk	70 (57 cars, 7 commercial, 6 bicycles)
Running Both Lights	4 (all bicycles)
Driving in Bus Lane	114 (104 cars, 10 commercial)
Stopping and Obstructing Traffic (incl. double parking)	5 (all cars)
Stopping in Bus Lane	12 (7 cars, 5 commercial)
Speeding	4 (3 car, 1 commercial)
Reckless Driving [1]	5 (4 cars, 1 commercial)
Cyclist Not Dismounting	10
Jaywalking	37 (1 jaywalker careless/obstructing traffic)
Other Motor Vehicle Violations [2]	1
Other Cyclist Violations [3]	5

1.
 - a. Commercial vehicle egregiously speeding, near miss with pedestrian
 - b. Car driving in bus lane, running red light, speeding, other careless driving
 - c. Car speeding up on yellow, aggressively tailgating, near rear-end accident
 - d. Car made illegal left turn from College on to Elm
 - e. Car passing other vehicles into oncoming traffic
2. Car made illegal three-point turn on College using bus lane
3.
 - a. Forced oncoming traffic to stop on Highland when running red
 - b. Cut into oncoming traffic at College and Highland
 - c. Traveling wrong direction on College
 - d. Traveling wrong direction on College, in bus/cycle lane
 - e. Crossed street illegally and cut off oncoming traffic

Elm/College/Day/Highland/Dover Intersection

Total Counts: 7

Violation Type	Count and Vehicle Type if Applicable
Poor Merging Technique	7 cars
Double Parking and Idling	14 (12 cars, 2 commercial)
Illegal Right on Red (Day to Elm)	10 (7 cars, 3 bicycles)
Illegal Left Turn	7 cars
Failure to Yield and Pedestrian Near Miss	4 cars
Speeding	3 (2 cars, 1 E-bike)
Other Reckless Behavior [1]	7 (4 cars, 1 bicycle, 1 E-Bike, 1 motorcycle)
Stopping and Blocking Intersection or Crosswalk [2]	8 (7 cars, 1 commercial vehicle)
Jaywalking	36
Other Pedestrian Violations [3]	3
Cyclist Not Dismounting	2
Other/Unclassified [4]	2 (1 pedestrian, 1 car)

1.
 - a. Bicycle dangerously cutting in front of traffic
 - b. E-bike speeding and passing in and out of traffic
 - c. Car making high rate-of-speed turn, cutting off oncoming traffic
 - d. Car cutting in front of other cars
 - e. Car merging poorly nearly causes accident
 - f. Motorcycle cut through closed turning lane in front of Mike's
 - g. Car almost hit crossing pedestrian
2. Three instances of vehicles stopping on green light to let pedestrians cross
3.
 - a. Two pedestrians recklessly cutting through middle of Elm and Day to get to CVS store
 - b. Bus and car had to wait in middle of Elm and College intersection to let jaywalker cross
4.
 - a. Elderly pedestrian with pushcart forced to walk down middle of Elm because of poor sidewalk conditions
 - b. Car attempted to turn wrong way onto Highland from Grove

Signal Times

SIGNALS (CLOCKWISE FROM ELM STREET EASTBOUND)

2:30-3:30 PM on Wednesday, April 19, 2023

Elm Street and Dover Street

Elm Street Eastbound @ Dover Street (Vehicles)

Time of Red Light: Approximately 1 minute 35 seconds

Time of Green Light: Approximately 20 seconds

Crosswalk from Davis Plaza to Dover Street Across Elm Street (Pedestrians):

Time of Wait Signal: Approximately 50 seconds

Time of Walk Signal: Approximately 40 seconds

Crosswalk on Elm Street Across Dover Street (Pedestrians):

Time of Wait Signal: Approximately 1 minute 15 seconds

Time of Walk Signal: Approximately 20 seconds

College Avenue Southbound

College Avenue Southbound @ Plaza/MBTA Crossing - 1st Light Sequence (Vehicles)

Time of Red Light: 1 minute 15 seconds

Time of Green Light: 20 seconds

College Avenue Southbound @ Plaza/MBTA Crossing - 1st Light Sequence (Pedestrians)

Time of Wait Signal: 1 minute 15 seconds

Time of Walk Signal: 20 seconds

College Avenue Southbound @ Highland Avenue - 2nd Light Sequence (Vehicles)

Time of Red Light: Approximately 1 minute

Time of Green Light: Approximately 35 seconds

College Avenue Southbound @ Highland Avenue - 2nd Light Sequence (Pedestrians)

Time of Wait Signal: Approximately 50 seconds

Time of Walk Signal: Approximately 50 seconds

Highland Avenue

Highland Avenue Westbound @ Davis Square Center (Vehicles)

Red (All Ways): Approximately 50 seconds

Red (Straight and Left Only): Approximately 20 seconds

Green (All Ways): Approximately 45 seconds

Green (Signaled Right Only): Approximately 20 seconds

Highland Avenue Crosswalk – Middlesex Savings to Mike's Plaza (Pedestrian)

Wait Signal: Approximately 1 minute 22 seconds

Walk Signal: 18 seconds

Day Street at Elm Street

Day Street Northbound @ Elm Street Right Turn Only (Vehicles)

Red Light: Approximately 1 minute 15 seconds

Green Light: Approximately 25 seconds

Crosswalk Across Elm Street @ Day Street (Pedestrians)

Wait Signal: 1 minute 15 seconds

Walk Signal: 25 seconds

Crosswalk Across Day Street Along Elm Street (Pedestrians)

Wait Signal: Approximately 1 minute

Walk Signal: Approximately 40 seconds

Locations Mentioned in Survey Open Text Questions Positive Mentions

Location	Number of Mentions
Somerville Theatre	36
Plaza	15
Post office	6
Public library <input type="checkbox"/>	8
Seven Hills Park	2
Playground	2
BFresh	13
The Burren	6
Redbones	2
McKinnons	8
Community garden	1
Goodwill	8
Atrius Health	1
CVS	9
Bowling alley/Flatbreads	3
Liquor store	1
gym	1
Mike's slipway	9
Farmer's market	4
Sira Naturals	2
Life Alive	1
Dragon Pizza	2
Davis Squared	2
Comicazi	2
When Pigs Fly	5
Sligo	4

Locations Mentioned in Survey Open Text Questions
Positive Mentions

JP Licks	2
Buffalo Exchange	3
Diesel	1
Tsurumen	1
Suigadama	1
<u>Dakzen</u>	2
Revival	1
Nellie's Wildflower	1

Locations Mentioned in Survey Open Text Questions
Negative Mentions

Location	Number of Mentions
Elm St by BFresh	1
Former Johnny D's	1
Highland into intersection	6
Dover & Holland/Elm	15
Elm & Day	8
Starbucks mall	3
College & Highland	6
Farmer's Market lot	1
Mike's slipway	9
Elm & Grove	1
Red Line crosswalk	3
Chipotle	1

Locations Mentioned in Survey Open Text Questions
Negative Mentions

Starbucks	1
Cutter St lot	1
Seven Hills Park	2
Summer & Cutter	2
Highland & Cutter	1
Plaza	1
Elm & Cutter	1
Highland & Grove	2